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Field Tests of Industrial Stoker Coal-Fired Boilers for Emissions Control and Efficiency Improvement - Site I (Data Supplement)

KVB, Inc.
Minneapolis, MN

Prepared for

Industrial Environmental Research Lab.
Research Triangle Park, NC

May 80

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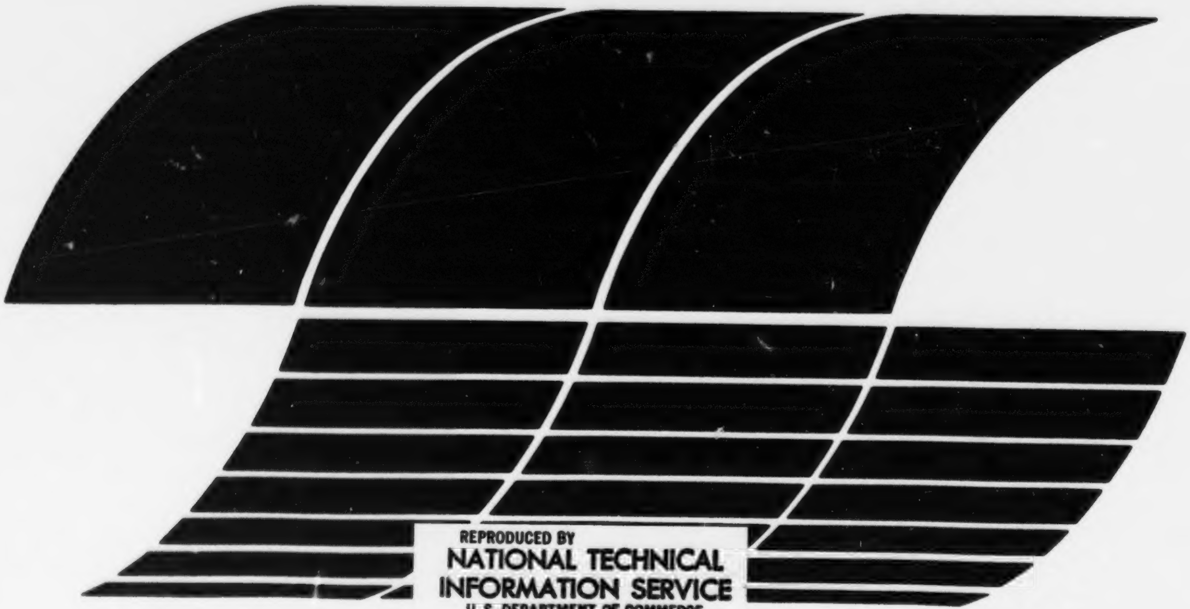

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16. ABSTRACT

The Data Supplement is a compilation of test data presented in greater detail than was practical in the final technical report. It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations, and conclusions. The final technical report also contains data summaries not found in this Supplement. The Supplement contains panel board data for each test, detailed particulate, O2, CO2, NO, SO2, and SO3 data, particle size distribution data, chemical analysis of the coal, coal size consistency data, and combustible analysis and overfire air traverse data.

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Project Officers: R. Hall (EPA) and W. Harvey, Jr. (DoE)

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Office of Environmental Engineering and Technology
Research Triangle Park, NC 27711

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and

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1a

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FOREWORD

The purpose of this Data Supplement Volume is to document data in greater detail than was practical in the Final Technical Report.[1] It is intended to provide the necessary details to other researchers who are interested in performing their own analysis. Readers are referred to the contract final report for information as to objectives, description of facility tested and coals fired, test equipment and procedures, interpretations and conclusions. The Final Technical Report also contains data summaries not found in this volume.

The data in this volume are arranged by type (i.e., Panel Board Data, Particulate Data, etc.) and within each type by test number. Data summaries where they exist are at the front of each section. The boiler tested is referred to as Boiler I; as it is the ninth boiler tested under the program entitled, "A Testing Program to Update Equipment Specifications and Design Criteria for Stoker Fired Boilers."

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[1] Langsjoen, P. L., et al., "Field Tests of Industrial Stoker Coal-Fired Boilers for Emissions Control and Efficiency Improvement - Site I."

CONVERSION FACTORS

ENGLISH AND METRIC UNITS TO SI UNITS

To Convert From	To	Multiply By
in	cm	2.540
in^2	cm^2	6.452
ft	m	0.3048
ft^2	m^2	0.09290
ft^3	m^3	0.02832
lb	Kg	0.4536
lb/hr	Mg/s	0.1260
$lb/10^6BTU$	ng/J	430
g/Mcal	ng/J	239
BTU	J	1054
BTU/lb	J/kg	2324
BTU/hr	W	0.2929
J/sec	W	1.000
J/hr	W	3600
BTU/ft/hr	W/m	0.9609
BTU/ft/hr	J/hr/m	3459
$BTU/ft^2/hr$	W/m^2	3.152
$BTU/ft^2/hr$	$J/hr/m^2$	11349
$BTU/ft^3/hr$	W/m^3	10.34
$BTU/ft^3/hr$	$J/hr/m^3$	37234
psia	Pa	6895
"H_2O	Pa	249.1
Rankine	Celsius	C = 5/9R-273
Fahrenheit	Celsius	C = 5/9(F-32)
Celsius	Kelvin	K = C+273
Rankine	Kelvin	K = 5/9R

FOR TYPICAL COAL FUEL

ppm @ 3% O_2 (SO_2)	ng/J ($lb/10^6Btu$)	0.851 (1.98×10^{-3})
ppm @ 3% O_2 (SO_3)	ng/J ($lb/10^6Btu$)	1.063 (2.47×10^{-3})
ppm @ 3% O_2 (NO)*	ng/J ($lb/10^6Btu$)	0.399 (9.28×10^{-4})
ppm @ 3% O_2 (NO_2)	ng/J ($lb/10^6Btu$)	0.611 (1.42×10^{-3})
ppm @ 3% O_2 (CO)	ng/J ($lb/10^6Btu$)	0.372 (8.65×10^{-4})
ppm @ 3% O_2 (CH_4)	ng/J ($lb/10^6Btu$)	0.213 (4.95×10^{-4})
g/kg of fuel**		

*Federal environmental regulations express NOx in terms of NO_2; thus NO units should be converted using the NO_2 conversion factor.

**Based on higher heating value of 10,000 Btu/lb. For a heating value other than 10,000 Btu/lb, multiply the conversion factor by 10,000/(Btu/lb).

KVB 4-15900-544

CONVERSION FACTORS

SI UNITS TO ENGLISH AND METRIC UNITS

To Convert From	To	Multiply By
cm	in	0.3937
cm^2	in^2	0.1550
m	ft	3.281
m^2	ft^2	10.764
m^3	ft^3	35.315
Kg	lb	2.205
Mg/s	lb/hr	7.937
ng/J	$lb/10^6BTU$	0.00233
ng/J	g/Mcal	0.00418
J	BTU	0.000948
J/kg	BTU/lb	0.000430
J/hr/m	BTU/ft/hr	0.000289
$J/hr/m^2$	$BTU/ft^2/hr$	0.0000881
$J/hr/m^3$	$BTU/ft^3/hr$	0.0000269
W	BTU/hr	3.414
W	J/hr	0.000278
W/m	BTU/ft/hr	1.041
W/m^2	$BTU/ft^2/hr$	0.317
W/m^3	$BTU/ft^3/hr$	0.0967
Pa	psia	0.000145
Pa	$"H_2O$	0.004014
Kelvin	Fahrenheit	F = 1.8K-460
Celsius	Fahrenheit	F = 1.8C+32
Fahrenheit	Rankine	R = F+460
Kelvin	Rankine	R = 1.8K
FOR TYPICAL COAL FUEL		
ng/J	ppm @ 3% O_2 (SO_2)	1.18
ng/J	ppm @ 3% O_2 (SO_3)	0.941
ng/J	ppm @ 3% O_2 (NO)	2.51
ng/J	ppm @ 3% O_2 (NO_2)	1.64
ng/J	ppm @ 3% O_2 (CO)	2.69
ng/J	ppm @ 3% O_2 (CH_4)	4.69
ng/J	g/kg of fuel	0.000233

SI PREFIXES

Multiplication Factor	Prefix	SI Symbol
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto*	h
10^{1}	deka*	da
10^{-1}	deci*	d
10^{-2}	centi*	c
10^{-3}	milli	m
10^{-6}	micro	µ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

*Not recommended but occasionally used

EMISSION UNITS CONVERSION FACTORS FOR TYPICAL COAL FUEL (HV = 13,320 BTU/LB)

To Obtain / Multiply By		% Weight in Fuel S	% Weight in Fuel N	lbs/10^6Btu SO_2	lbs/10^6Btu NO_2	grams/10^6Cal SO_2	grams/10^6Cal NO_2	PPM (Dry @ 3% O_2) SOx	PPM (Dry @ 3% O_2) NOx	Grains/SCF. (Dry @ 12% CO_2) SO_2	Grains/SCF. (Dry @ 12% CO_2) NO_2
% Weight In Fuel	S	1		0.666		0.370		13.2×10^{-4}		1.48	
	N				0.405		0.225		5.76×10^{-4}		.903
lbs/10^6Btu	SO_2	1.50		1		(.556)		19.8×10^{-4}		(2.23)	
	NO_2		2.47				(.556)		14.2×10^{-4}		(2.23)
grams/10^6Cal	SO_2	2.70		(1.8)		1		35.6×10^{-4}		(4.01)	
	NO_2		4.44		(1.8)				25.6×10^{-4}		(4.01)
PPM (Dry @ 3% O_2)	SOx	758		505		281		1		1127	
	NOx		1736		704		391				1566
Grains/SCF (Dry @ 12% CO_2)	SO_2	.676		(.448)		(.249)		8.87×10^{-4}		1	
	NO_2		1.11		(.448)		(.249)		6.39×10^{-4}		

NOTE: 1. Values in parenthesis can be used for all flue gas constituents such as oxides of carbon, oxides of nitrogen, oxides of sulfur, hydrocarbons, particulates, etc.
2. Standard reference temperature of 530°R was used.

SECTION 1.0

PANEL BOARD DATA

PAGE

1.1 CONTROL ROOM DATA 2

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PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 35,207
Coal Flow, lbs/hr 4570
% Design Capacity 50.3
lb steam/lb coal 7.7

TEST NO.	1				
TEST DATE	4-28-79				
TEST COAL	Ohio				
TEST CONDITIONS	low load	as found			
COAL					
TIME	10:45		12:30		
POUNDS ADDED	filled		4 tons		
STEAM					
INTEGRATOR READING	190839	190879	190910		
TIME	10.34	11.42	12.35		
CHART RECORDER					
STEAM FLOW, Klbs/hr	35	34	36		
AIR FLOW, RELATIVE	52	55	57		
FLUE GAS TEMP, °F	490	505	520		
STEAM PRESSURE, PSIG	157	153	155		
WATER TEMPERATURE, °F	160	160	161		
STEAM PRESSURE, PSIG	157	153	155		
FEEDWATER TEMP, °F	218	217	218		
TEMP FD FAN, °F		49			
RELATIVE HUMIDITY, %		74			

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TEST NO.	1				
DRAFT GAUGES					
WINDBOX PRESSURE #1 "H_2O	0	0	0		
2 "H_2O	0.75	0.90	0.90		
3 "H_2O	0.20	0.25	0.25		
4 "H_2O	0	0	0		
5 "H_2O	0	0	0		
6 "H_2O	0	0	0		
FURNACE DRAFT "H_2O	-0.1	-0.1	-0.1		
FD FAN "H_2O	1.6	2.0	2.0		
OFA "H_2O	3.0	3.0	3.0		
BOILER OUT "H_2O	-0.5	-0.5	-0.5		
CONTROLS					
OFA	8	8	8		
FORCED DRAFT FAN	9.0/10.0	13.0/13.0	12.0/12.0		
STOKER SPEED	10.0/9.0	12.0/12.0	12.0/12.0		
STEAM FLOW/AIR FLOW	12	12	12.5		
STOKER					
COAL GATE POSITION	6	6	6		
GRATE SPEED, %	35	39	37		
WINDBOX CONTROL POSITION #1	0.5	0.5	0.5		
#2	40	4.0	4.0		
#3	2.0	2.0	2.0		
#4	0.8	0.8	0.8		
#5	0.5	0.5	0.5		
#6	0.5	0.5	0.5		

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PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 68,462
Coal Flow, lbs/hr 8000
% Design Capacity 97.8
lb steam/lb coal 86

TEST NO.	2				
TEST DATE	4-30-79				
TEST COAL	Ohio				
TEST CONDITIONS	MAX LOAD	as found			
COAL					
TIME	11:00			13:45	
POUNDS ADDED	filled			4 tons	
STEAM					
INTEGRATOR READING	192438	192500	192578	192616	
TIME	11:11	12:07	13:42	13:47	
CHART RECORDER					
STEAM FLOW, Klbs/hr	70	68	68		
AIR FLOW, RELATIVE	90	84	79		
FLUE GAS TEMP, °F	585	580	580		
STEAM PRESSURE, PSIG	145	145	150		
WATER TEMPERATURE, °F	155	159	159		
STEAM PRESSURE, PSIG	145	145	150		
FEEDWATER TEMP, °F	215	217	215		
TEMP FD FAN, °F		50			
RELATIVE HUMIDITY, %					

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TEST NO.	2				
DRAFT GAUGES					
WINDBOX PRESSURE #1 "H_2O	0.1	0.1	0.1		
2 "H2O	1.8	2.0	1.2		
3 "H_2O	1.3	1.5	0.9		
4 "H_2O	0.1	0.1	0.2		
5 "H2O	0	0	0		
6 "H_2O	0	0	0		
FURNACE DRAFT "H_2O	-0.05	-0.10	-0.1		
FD FAN "H2O	2.7	3.0	2.0		
OFA "H2O	3.0	3.0	3.0		
BOILER OUT "H2O	-1.0	-1.0	-1.0		
CONTROLS					
OFA	8.5	8.5			
FORCED DRAFT FAN	19.5/20.0	15.5/15.5	12.0/14.0		
STOKER SPEED	19.0/17.5	17.5/17.5	16.0/13.0		
STEAM FLOW/AIR FLOW	21.0	20.0	20.0		
STOKER					
COAL GATE POSITION	8.2	8.5	7.9		
GRATE SPEED, %	58	58	45		
WINDBOX CONTROL POSITION #1	1.0	0.5	0.5		
#2	4.5	5.0	4.5		
#3	3.5	3.5	3.5		
#4	1.5	0.5	1.0		
#5	0	0	0		
#6	0	0	0		

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NOTES

TEST NO: 2 , Air Flow doesn't seem to be controlable Air swings from 70 to 100% as per approximate load per (70%) stack smokes testing was stopped at 13:00 when boiler was smoking. This is the only boiler on line so it is picking up any load increases or decreases from the laundry

TEST NO: 2 Load is between 65-75 Klbs/hr

TEST NO:

TEST NO:

TEST NO:

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 72,188
Coal Flow, lbs/hr 8250
% Design Capacity 103.1
lb steam/lb coal 8.75

TEST NO.	3				
TEST DATE	5-1-79				
TEST COAL	Ohio				
TEST CONDITIONS	high load	high LFA			
COAL					
TIME	9:50		11:50		
POUNDS ADDED	filled		8¼		
STEAM					
INTEGRATOR READING	193433	193507	193587		
TIME	9:50	10:52	11:58		
CHART RECORDER					
STEAM FLOW, Klbs/hr	68	70	71		
AIR FLOW, RELATIVE	90	98	95		
FLUE GAS TEMP, °F	600	590	607		
STEAM PRESSURE, PSIG	155	130	140		
WATER TEMPERATURE, °F	160	160	161		
STEAM PRESSURE, PSIG	155	130	140		
FEEDWATER TEMP, °F		215	216		
TEMP FD FAN, °F	45	48	50		
RELATIVE HUMIDITY, %		72			

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TEST NO.		3				
DRAFT GAUGES						
WINDBOX PRESSURE #1	"H_2O	0	0	0		
2	"H2O	1.0	1.0	1.0		
3	"H_2O	0.9	0.85	0.85		
4	"H_2O	0.7	0.7	0.7		
5	"H_2O	0	0.05	0.05		
6	"H_2O	0	0	0		
FURNACE DRAFT	"H_2O	-0.2	-0.2	-0.17		
FD FAN	"H_2O	1.6	2.0	2.2		
OFA	"H_2O	10.0	10.0	10.0		
BOILER OUT	"H_2O	-1.0	-1.0	-1.0		
CONTROLS						
OFA		19.5	19.5	19.5		
FORCED DRAFT FAN		90/14.0	30.0/15.0	30.0/14.0		
STOKER SPEED		17.0/17.0	18.0/14.5	17.0/17.0		
STEAM FLOW/AIR FLOW		21.0	22.0	21.0		
STOKER						
COAL GATE POSITION		8.0	8.8	8.8		
GRATE SPEED, %		55	55	55		
WINDBOX CONTROL POSITION #1		0.5	0.5	0.5		
#2		3.5	3.5	3.5		
#3		4.0	4.0	4.0		
#4		2.0	2.0	2.0		
#5		0	0	0		
#6		0	0	0		

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PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 70,000
Coal Flow, lbs/hr 7385
% Design Capacity 100.0
lb steam/lb coal 9.5

TEST NO.	4				
TEST DATE	5-01-79				
TEST COAL	Ohio				
TEST CONDITIONS	low O_2	high OFA			
COAL					
TIME	13:50		16:00		
POUNDS ADDED	filled		8 tons		
STEAM					
INTEGRATOR READING	193721	193793	193861		
TIME	13:53	14:55	15:53		
CHART RECORDER					
STEAM FLOW, Klbs/hr	70	72	70		
AIR FLOW, RELATIVE	82	84			
FLUE GAS TEMP, °F	570	590			
STEAM PRESSURE, PSIG	127	150			
WATER TEMPERATURE, °F	160	160			
STEAM PRESSURE, PSIG	125	150			
FEEDWATER TEMP, °F	217	217			
TEMP FD FAN, °F	52	55	61		
RELATIVE HUMIDITY, %			55		

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TEST NO.		4				
DRAFT GAUGES						
WINDBOX PRESSURE #1	"H_2O	0	0			
2	"H2O	0.5	0.8			
3	"H_2O	0.35	0.7			
4	"H_2O	0.20	0.30			
5	"H_2O	0	0			
6	"H_2O	0	0			
FURNACE DRAFT	"H_2O	-0.20	-0.14			
FD FAN	"H_2O	0.8	1.2			
OFA	"H_2O	10.0	10.0			
BOILER OUT	"H_2O	-1.0	-1.0			
CONTROLS						
OFA		20.0	20.0			
FORCED DRAFT FAN		30.0/13.0	30.0/12.5			
STOKER SPEED		15.5/15.0	15.5/15.5			
STEAM FLOW/AIR FLOW		21.0	21.0			
STOKER						
COAL GATE POSITION		8.5	8.5			
GRATE SPEED, %		50	50			
WINDBOX CONTROL POSITION #1		0	0			
#2		5.0	5.0			
#3		4.0	4.0			
#4		2.0	2.0			
#5		1.0	1.0			
#6		0	0			

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PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 57,143
Coal Flow, lbs/hr 5455
% Design Capacity 81.6
lb steam/lb coal 10.5

TEST NO.	5				
TEST DATE	5-2-79				
TEST COAL	Ohio				
TEST CONDITIONS	75% load				
COAL					
TIME	10:20		12:10		
POUNDS ADDED	filled		5 tons		
STEAM					
INTEGRATOR READING	194525	194583	194625		
TIME	10:20	11:22	12:05		
CHART RECORDER					
STEAM FLOW, Klbs/hr	55	54			
AIR FLOW, RELATIVE	75	75			
FLUE GAS TEMP, °F	590	600			
STEAM PRESSURE, PSIG	135	150			
WATER TEMPERATURE, °F	160	160			
STEAM PRESSURE, PSIG	135	150			
FEEDWATER TEMP, °F	217	218			
TEMP FD FAN, °F	54	58			
RELATIVE HUMIDITY, %					

KVB

TEST NO.	5				
DRAFT GAUGES					
WINDBOX PRESSURE #1 "H_2O	0	0			
2 "H2O	1.0	1.2			
3 "H_2O	0.9	1.0			
4 "H_2O	0.20	0.25			
5 "H_2O	0	0			
6 "H_2O	0	0			
FURNACE DRAFT "H_2O	-0.1	-0.1			
FD FAN "H_2O	2.1	2.1			
OFA "H_2O	6.0	6.0			
BOILER OUT "H_2O	-0.8	-0.8			
CONTROLS					
OFA	12.0	12.0			
FORCED DRAFT FAN	30.0/140	12.0/14.0			
STOKER SPEED	15.5/16.5	15.0/15.0			
STEAM FLOW/AIR FLOW	17.5	17.0			
STOKER					
COAL GATE POSITION	7.0	7.0			
GRATE SPEED, %	56	52			
WINDBOX CONTROL POSITION #1	1.0	1.0			
#2	4.0	4.0			
#3	4.0	4.0			
#4	1.0	1.0			
#5	0	0			
#6	0	0			

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 68936
Coal Flow, lbs/hr 6545
% Design Capacity 98.5
lb steam/lb coal 10.5

TEST NO.	6				
TEST DATE	5-8-79				
TEST COAL	Ohio				
TEST CONDITIONS	max load as found				
	Brink & SASS sizing				
COAL					
TIME	12:15	13:15		14:05	
POUNDS ADDED	filled	filled		6 tons	
STEAM					
INTEGRATOR READING	198588	198670	198716	198750	
TIME	12:15	13:28	14:09	14:36	
CHART RECORDER					
STEAM FLOW, Klbs/hr	70		72		
AIR FLOW, RELATIVE	85		85		
FLUE GAS TEMP, °F	610		585		
STEAM PRESSURE, PSIG	137		125		
WATER TEMPERATURE, °F	164		164		
STEAM PRESSURE, PSIG	138		127		
FEEDWATER TEMP, °F	213		215		
TEMP FD FAN, °F	88		94		
RELATIVE HUMIDITY, %			42		

TEST NO.	6				
DRAFT GAUGES					
WINDBOX PRESSURE #1 "H_2O	0		0		
2 "H2O	2.0		1.7		
3 "H_2O	1.4		1.4		
4 "H_2O	0		0.2		
5 "H_2O	0		0		
6 "H_2O	0		0		
FURNACE DRAFT "H_2O	-.16		-0.12		
FD FAN "H_2O	3.6		3.4		
OFA "H_2O	3.0		3.0		
BOILER OUT "H_2O	-1.0		-1.0		
CONTROLS					
OFA	80		8		
FORCED DRAFT FAN	30/18.0		30/?		
STOKER SPEED	19.0/20.5		10.0/11.5		
STEAM FLOW/AIR FLOW	21.0		21.0		
STOKER					
COAL GATE POSITION	7.6		8.0		
GRATE SPEED, %	70		60		
WINDBOX CONTROL POSITION #1	0.5		0.5		
#2	4.0		4.0		
#3	35		3.5		
#4	0		0		
#5	0		0		
#6	0		0		

KVB

NOTES

TEST NO: 6-2 Brink stages were galled so it was impossible to use it
Gaseous drier was frozen at the start of testing so not
much gaseous data was taken

TEST NO:

TEST NO:

TEST NO:

TEST NO:

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr	72,727	50294
Coal Flow, lbs/hr	8571	6545
% Design Capacity	1039	71.8
lb steam/lb coal	8.5	77

TEST NO.	7A	7B 7C	8A	5B	5C
TEST DATE	5-09-79				
TEST COAL	Ohio				
TEST CONDITIONS	70,000				
	vary O2				
COAL					
TIME	10:00	11:10	12:00		1255
POUNDS ADDED	filled	5 tons	filled		3 ton
STEAM					
INTEGRATOR READING	199212	199292	199327		199384
TIME	10:14	11:20	11:57		1305
CHART RECORDER					
STEAM FLOW, Klbs/hr	71	70 70	50	52	50
AIR FLOW, RELATIVE	95	88 70	70	65	53
FLUE GAS TEMP, °F	625	615	555		
STEAM PRESSURE, PSIG	150	143	145		
WATER TEMPERATURE, °F	162	162	162		
STEAM PRESSURE, PSIG	150	142	145		
FEEDWATER TEMP, °F	213	213	214		
TEMP FD FAN, °F			89		
RELATIVE HUMIDITY, %			50		

KVB

TEST NO.	7	7			
DRAFT GAUGES					
WINDBOX PRESSURE #1 "H_2O	0	0	0		
2 "H2O	1.4	1.2	1.2		
3 "H_2O	1.3	1.0	1.0		
4 "H_2O	0.8	0.6	0		
5 "H2O	0	0	0		
6 "H_2O	0	0	0		
FURNACE DRAFT "H_2O	-0.1	-0.1	-0.12		
FD FAN "H_2O	2.7	2.2	24		
OFA "H_2O	3.0	3.0	3.0		
BOILER OUT "H2O	-1.0	-1.0	-1.0		
CONTROLS					
OFA	8.0	8.0	8.0		
FORCED DRAFT FAN	22/17	30/16	24/14		
STOKER SPEED	18/21	17.5/21	14.5/17.0		
STEAM FLOW/AIR FLOW	21	21	21		
STOKER					
COAL GATE POSITION	8.0	8.0	65		
GRATE SPEED, %	65	67	60		
WINDBOX CONTROL POSITION #1	0	0	0		
#2	4.0	4.0	4.0		
#3	4.0	4.0	35		
#4	2.0	20	2.0		
#5	0	0	0		
#6	0	0	0		

KVB

NOTES

TEST NO: 7 At low O_2 - (air per 70%) - boiler was smoking pretty bad

TEST NO:

TEST NO:

TEST NO:

TEST NO:

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 71,345
Coal Flow, lbs/hr 7149
% Design Capacity 101.9
lb steam/lb coal 10.0

TEST NO.	9				
TEST DATE	5-10-79				
TEST COAL	Ohio				
TEST CONDITIONS	70,000				
	normal SASS				
COAL					
TIME	11:05			15:00	
POUNDS ADDED	filled			14 tons	
STEAM					
INTEGRATOR READING	199865	199976	200103	200142	
TIME	11:12	1244	14:33	15:10	
CHART RECORDER					
STEAM FLOW, Klbs/hr	74	68	72		
AIR FLOW, RELATIVE	86	90	86		
FLUE GAS TEMP, °F	610	630	600		
STEAM PRESSURE, PSIG	142	157	135		
WATER TEMPERATURE, °F	165	165	165		
STEAM PRESSURE, PSIG	143	158	135		
FEEDWATER TEMP, °F	216	216	217		
TEMP FD FAN, °F		89			
RELATIVE HUMIDITY, %		68			

KVB

TEST NO.	9				
DRAFT GAUGES					
WINDBOX PRESSURE #1 "H_2O	0	0	0		
2 "H2O	1.2	1.2	1.4		
3 "H_2O	1.0	1.0	1.1		
4 "H_2O	8	9	0.6		
5 "H_2O	0	0	0		
6 "H_2O	0	0	0		
FURNACE DRAFT "H_2O	-0.07	-0.10	-0.10		
FD FAN "H_2O	2.0	2.0	2.4		
OFA "H_2O	10.0	9.5	9.5		
BOILER OUT "H_2O	-1.0	-1.1	-1.0		
CONTROLS					
OFA	19	19	19		
FORCED DRAFT FAN	30/15.0	12/15	30.0/15.		
STOKER SPEED	17/23	16/13.5	17.0/20.		
STEAM FLOW/AIR FLOW	21	21	21		
STOKER					
COAL GATE POSITION	7.9	7.5	8.0		
GRATE SPEED, %	85	45	70		
WINDBOX CONTROL POSITION #1	0	1	0		
#2	4.0	4.0	4.0		
#3	3.7	3.7	3.0		
#4	2.7	2.7	2.5		
#5	1	0	1		
#6	1	0	[illegible]		

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 33,488
Coal Flow, lbs/hr 3000
% Design Capacity 47.8
lb steam/lb coal 11.2

TEST NO.	10				
TEST DATE	5-12-79				
TEST COAL	Kentucky				
TEST CONDITIONS	35,000				
	as found				
COAL					
TIME	10:00			12:00	
POUNDS ADDED	filled			3 tons	
STEAM					
INTEGRATOR READING	201024			201046	
TIME	10.05	11:00	12:00	12.14	
CHART RECORDER					
STEAM FLOW, Klbs/hr	36	35	33		
AIR FLOW, RELATIVE	54	57	58		
FLUE GAS TEMP, °F	485	510	495		
STEAM PRESSURE, PSIG	130	150	143		
WATER TEMPERATURE, °F	161	161	161		
STEAM PRESSURE, PSIG	130	150	145		
FEEDWATER TEMP, °F	217	217	217		
TEMP FD FAN, °F		77			
RELATIVE HUMIDITY, %		60			

TEST NO.	10				
DRAFT GAUGES					
WINDBOX PRESSURE #1 "H_2O	0	0	0		
2 "H2O	1.0	1.7	1.5		
3 "H_2O	0.5	0.5	0.4		
4 "H_2O	0	0	0		
5 "H_2O	0	0	0		
6 "H_2O	0	0	0		
FURNACE DRAFT "H_2O	-0.1	-0.1	-0.1		
FD FAN "H_2O	2.2	3.0	3.0		
OFA "H_2O	3	3	3		
BOILER OUT "H_2O	-0.4	-0.5	0.4		
CONTROLS					
OFA	8.0	8.0	8.0		
FORCED DRAFT FAN	30.0/13.0	0/14.0	20.0/14.0		
STOKER SPEED	15.5/24.0	5.0/16.0	15.5/15.0		
STEAM FLOW/AIR FLOW	13.0	13.0	13.0		
STOKER					
COAL GATE POSITION	4.7	4.7	4.8		
GRATE SPEED, %	85	85	60		
WINDBOX CONTROL POSITION #1	.5	.5	5		
#2	2.	4.5	5.0		
#3	2.7	2.0	1.0		
#4	0	0	[illegible]		
#5	0	[illegible]	1		
#6	0	[illegible]	[illegible]		

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 50,000
Coal Flow, lbs/hr 4364
% Design Capacity 71.4
lb steam/lb coal 11.5

TEST NO.	14				
TEST DATE	5-14-79				
TEST COAL	Kentucky				
TEST CONDITIONS	50,000 lbs/hr				
	as found				
COAL					
TIME	1000		11:50		
POUNDS ADDED	filled		4 tons		
STEAM					
INTEGRATOR READING	202140		202240		
TIME	1000		12:00		
CHART RECORDER					
STEAM FLOW, Klbs/hr	50	50	48		
AIR FLOW, RELATIVE	68	73	72		
FLUE GAS TEMP, °F	527	540	537		
STEAM PRESSURE, PSIG	140	150	150		
WATER TEMPERATURE, °F	160	160	161		
STEAM PRESSURE, PSIG	142	153	152		
FEEDWATER TEMP, °F	218	218	217		
TEMP FD FAN, °F	68				
RELATIVE HUMIDITY, %	70				

KVB

TEST NO.						
DRAFT GAUGES		14				
WINDBOX PRESSURE #1	"H_2O	0	0	0		
2	"H2O	1.8	1.6	1.6		
3	"H_2O	1.0	1.0	0.9		
4	"H_2O	0	0.2	0.2		
5	"H2O	0	0	0		
6	"H_2O	0	0	0		
FURNACE DRAFT	"H_2O	-0.08	-0.08	-0.09		
FD FAN	"H_2O	3.4	3.2	3.2		
OFA	"H_2O	4.0	4.0	4.0		
BOILER OUT	"H_2O	-0.8	-0.8	-0.8		
CONTROLS						
OFA		10.0	10.0	10.0		
FORCED DRAFT FAN		27/15.5	12.5/15.5	15.0/15.0		
STOKER SPEED		15.0/15.0	15.0/15.5	14.5/15.0		
STEAM FLOW/AIR FLOW		15.5	15.5	15.5		
STOKER						
COAL GATE POSITION		6.8	6.6	6.0		
GRATE SPEED, %		55	54	48		
WINDBOX CONTROL POSITION #1		.5	5	.5		
#2		4.0	4.0	4.0		
#3		3.0	3.0	3.0		
#4		.5	1.0	0.8		
#5		0	0	0		
#6		0	0	0		

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 70.612
Coal Flow, lbs/hr 6643
% Design Capacity 100.9
lb steam/lb coal 10.6

TEST NO.	15				
TEST DATE	5-22-79				
TEST COAL	Kentucky				
TEST CONDITIONS	70,000 lbs/hr				
COAL					
TIME	1006	1106	1208	12:53	
POUNDS ADDED	206535	206605	206678	206708	
STEAM					
INTEGRATOR READING	filled			7 3/4 ton	
TIME	1012			12:32	
CHART RECORDER					
STEAM FLOW, Klbs/hr	70	70	72		
AIR FLOW, RELATIVE	80	82	80		
FLUE GAS TEMP, °F	580	570	570		
STEAM PRESSURE, PSIG	125	120	115		
WATER TEMPERATURE, °F	161	160	160		
STEAM PRESSURE, PSIG	125	120	115		
FEEDWATER TEMP, °F		217	219		
TEMP FD FAN, °F			70		
RELATIVE HUMIDITY, %			52		

KVB

TEST NO.						
DRAFT GAUGES						
WINDBOX PRESSURE #1	"H_2O	0	0.3	0		
2	"H2O	1.5	1.3	1.4		
3	"H_2O	1.0	0.8	1.0		
4	"H_2O	0.1	0.1	0.2		
5	"H_2O	0	0	0		
6	"H_2O	0	0	0		
FURNACE DRAFT	"H_2O	-0.09	-0.10	-0.10		
FD FAN	"H_2O	38	3.0	3.0		
OFA	"H_2O	4.0	4.0	4.0		
BOILER OUT	"H_2O	-0.8	-0.9	-0.9		
CONTROLS						
OFA		10.0	10.0	10.0		
FORCED DRAFT FAN		30/18.0	30/16.0	30/16.5		
STOKER SPEED		14.0/23.0	18.0/25.0	18.0/24.0		
STEAM FLOW/AIR FLOW		22.0	21.0	21.0		
STOKER						
COAL GATE POSITION		7.0	7.0	7.0		
GRATE SPEED, %		74	80	80		
WINDBOX CONTROL POSITION #1		1.0	1.0	1.0		
#2		3.0	2.1	2.1		
#3		2.5	2.5	2.5		
#4		0.5	0.5	0.5		
#5		0	0	0		
#6		0	0	0		

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 71,087
Coal Flow, lbs/hr 6900
% Design Capacity 101.6
lb steam/lb coal 10.3

TEST NO.	16		17		
TEST DATE	5-23-79		5-23-79		
TEST COAL	Kentucky		Kentucky		
TEST CONDITIONS	70,000		50,000		
	gaseous		gaseous		
COAL					
TIME	940	1120	14:10		
POUNDS ADDED	Filled	5¾ ton	filled	wash out	
STEAM				No dial	
INTEGRATOR READING	943	10:15	14:12		
TIME	207230	207339	207475		
CHART RECORDER					
STEAM FLOW, Klbs/hr	68	70	50		
AIR FLOW, RELATIVE	88	82 76	69		
FLUE GAS TEMP, °F	630	585	440		
STEAM PRESSURE, PSIG	147	125	125		
WATER TEMPERATURE, °F	161	161	161		
STEAM PRESSURE, PSIG	147	125	125		
FEEDWATER TEMP, °F		217	217		
TEMP FD FAN, °F					
RELATIVE HUMIDITY, %					

KVB

TEST NO.		16		17		
DRAFT GAUGES						
WINDBOX PRESSURE #1	"H_2O	0	0	0		
2	"H2O	1.6	1.3	2.3		
3	"H_2O	1.1	0.9	0.4		
4	"H_2O	0.4	0.4	0		
5	"H2O	0	0	0		
6	"H_2O	0	0	0		
FURNACE DRAFT	"H2O	-0.1	-0.1	-0.1		
FD FAN	"H2O	3.2	3.7	3.4		
OFA	"H2O	4.0	4.0	4.0		
BOILER OUT	"H2O	-1.0	-1.0	-0.8		
CONTROLS						
OFA		10.0	10.0	10.0		
FORCED DRAFT FAN		18.5/16.5	14.0/17.0	30/18.0		
STOKER SPEED		18.0/18.0	18.0/18.0	16.0/30.0		
STEAM FLOW/AIR FLOW		20.0	20.0	16.0		
STOKER						
COAL GATE POSITION		71		5.7		
GRATE SPEED, %		56		54		
WINDBOX CONTROL POSITION #1		0		0		
#2		37		5.0		
#3		3.0		1.5		
#4		1.0		0		
#5		0		0		
#6		0		0		

KVB

PANEL BOARD DATA
ABMA TEST SITE I

Steam Flow, lbs/hr 71,000
Coal Flow, lbs/hr 6200
% Design Capacity 101.4
lb steam/lb coal 11.5

TEST NO.	18				
TEST DATE	5-24-79				
TEST COAL	Kentucky				
TEST CONDITIONS	70,000				
	high OFA SASS-SOx				
COAL					
TIME	12:15			1715	
POUNDS ADDED	filled			15½ tons	
STEAM					
INTEGRATOR READING	208050	208157	208264	208405	
TIME	12:15	13:46	1517	1715	
CHART RECORDER					
STEAM FLOW, Klbs/hr	70	72	70		
AIR FLOW, RELATIVE	85	80?	82?		
FLUE GAS TEMP, °F	625	620	580		
STEAM PRESSURE, PSIG	150	140	155		
WATER TEMPERATURE, °F	160	160	160		
STEAM PRESSURE, PSIG	150	140	155		
FEEDWATER TEMP, °F	217		217		
TEMP FD FAN, °F			68		
RELATIVE HUMIDITY, %			72		

KVB

TEST NO.						
DRAFT GAUGES						
WINDBOX PRESSURE #1	"H_2O	0	0	0		
2	"H2O	17	1.7	1.5		
3	"H_2O	1.3	1.3	1.0		
4	"H_2O	0.3	0.2	0.2		
5	"H_2O	0	0	0		
6	"H_2O	0	0	0		
FURNACE DRAFT	"H_2O	-0.1	-0.1	-0.08		
FD FAN	"H_2O	3.2	3.0	2.4		
OFA	"H_2O	8.0	8.0	8.0		
BOILER OUT	"H_2O	-1.0	-1.0	-1.0		
CONTROLS						
OFA		15.0	15.0	15.0		
FORCED DRAFT FAN		24.0/17.0	21.0/16.0	16.5/15.0		
STOKER SPEED		19.0/25.0	14.0/20.0	18.0/12.0		
STEAM FLOW/AIR FLOW		21.0	21.0	21.0		
STOKER						
COAL GATE POSITION		6.2	7.5	7.0		
GRATE SPEED, %		80	60	55		
WINDBOX CONTROL POSITION #1		5	5	5		
	#2	4.5	4.0	4.0		
	#3	3.0	3.0	3.0		
	#4	5	5	5		
	#5	0	0	0		
	#6	0	0	0		

SECTION 2.0

PARTICULATE DATA

PAGE

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2.2 PARTICULATE DATA 34

2.3 PARTICULATE LAB WORKSHEETS 42

PARTICULATE DATA SUMMARY
PART I

Area = 10.39 ft^2

LOCATION: ABMA TEST SITE I

TEST NO.	Total Mass mgm.	Dry Gas Volume ft^3	Liquid Coll. ml.	Baro. Press. "Hg	Static Press. "H_2O	Pitot ΔP "H_2O	Orifice ΔH "H_2O	Stack Gas Temp. °R	Excess O_2 %	Sampling Time min.	Nozzle Dia. in.	Pitot Factor n.d.	Fuel Factor SCF/10^6BTU	Flue Gas MW g/g mole
01	454.3	42.408	38	29.40	-0.16	0.20	0.65	970	11.8	72	0.316	0.837	9820	29.21
02	2016.0	41.163	68	29.51	-0.22	0.310	0.30	1052	8.3	96	0.246	0.837	9820	29.25
03	1913.5	61.486	99	29.85	-0.24	0.35	0.98	1088	8.3	96	0.316	0.837	9820	29.31
04	1225	[illegible]	96.5	29.85	-0.25	0.274	0.74	1065	6.6	96	0.316	0.837	9820	29.26
15	1020.4	39.988	57	29.78	-0.24	0.21	0.56	1013	8.9	72	0.316	0.837	9820	29.23
10	684.8	45.040	59	29.62	-0.21	0.136	0.40	975	11.6	96	0.316	0.837	9820	29.05
14	1430.0	44.893	64	29.61	-0.24	0.27	0.74	1066	10.1	72	0.316	0.837	9820	29.14
15	3631.0	85.405	128	29.75	-.32	0.26	1.33	1044	7.6	96	0.379	0.837	9820	29.37
													CORRECTED	
1													9935	
2													9727	
3													9614	
4													9727	
5													9722	
10													9893	
14													[illegible]	
15													9693	

#15900 rev.

PARTICULATE DATA SUMMARY
PART II

Location Test Site I

TEST NO.	LOAD %	O_2 %	CONDITIONS	EMISSIONS			Moisture %	Stack Gas Velocity Ft/sec	Stack Gas Flow SCF/sec	Isokin. %
				lb/10^6BTU	GR/SCF	LB/HR				
01	50.3	11.8	as found	0.540	0.168	31	4.14	34.01	354	102
02	97.8	8.3	as found	1.779	0.766	167	7.35	43.99	424	106
03	103.1	8.3	high OFA	1.019	0.439	100	6.50	47.22	445	100
04	100.0	6.6	low O_2, high OFA	0.907	0.443	91	7.09	41.37	398	100
05	81.6	8.9	as found	0.964	0.395	73	6.35	35.38	357	98
10	50.3	11.6	as found	0.744	0.237	36	5.90	28.09	293	100
14	71.4	10.1	as found	1.343	0.496	103	6.38	40.15	406	97
15	100.0	7.6	optimum O_2 + OFA	1.448	0.658	132	6.65	39.89	390	101
			corrected for coal ↓							
01				0.541	0.168	31	4.14	34.01	354	102
02				1.763	0.766	167	7.35	43.99	424	106.
03				0.949	0.439	100	6.50	47.22	444	100
04				0.904	0.443	91	7.09	41.37	398	100
05				0.954	0.395	73	6.35	35.38	357	98
10				0.734	0.237	36	5.90	28.09	293	100
14				1.341	0.496	103	6.38	40.15	406	97
15				1.430	0.658	132	6.65	39.89	390	101

PARTICULATE

DATA

Sampling Time Per Point, Min
3.0

Leak Check Rate

Vac in. Hg ft^3/min

Before

After

ISOKINETICS = 101.7 %

TEST NUMBER 1

DATE 4-28-79

OPERATOR R.A.P.

FUEL OHIO

SITE I

PROBE LOCATION STACK-#3

LEAK CHECK

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$,%	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
N-1	10:37	.04	1.20	4876.57	480	200	220		50	65		<2.0
2		.05	.15	4877.55	480	220	220		45	55		<2.0
3		.05	.15	4878.58	480	230	230		42	62		<2.0
4		.06	.18	4879.54	485	245	235		45	62		<2.0
5		.07	.21	4880.62	490	250	220		42	65		<2.0
6		.07	.21	4881.74	490	240	220		42	62		<2.0
7		.18	.54	4883.523	525	235	250		45	65		2.0
8		.38	1.12	4883.683 4886.19	530	220	220		—	—		2.0
9		.49	1.45	4888.87	540	230	220		—	—		2.3
10		.61	1.85	4891.94	540	230	220		48	68		3.0
11		.58	1.75	4894.91	—	230	230		48	70		3.0
12		.48	1.42	4897.592	—	230	230		50	72		2.5
E-1		.11	.32	4898.92	500	260	280		55	78		<2.0
2		.13	.40	4960.44	505	280	290		55	78		<2.0
3		.18	.55	4902.21	510	290	290		55	78		<2.0
4		.18	.55	4903.91	520	300	300		55	79		<2.0
5		.17	.52	4905.58	520	300	300		55	80		<2.0
6		.10	.31	4906.88	520	300	300		56	80		<2.0
7		.12	.36	4908.33	520	290	300		56	80		<2.0
8		.15	.46	4909.82	525	280	295		53	82		<2.0
9		.18	.55	4911.56	525	280	300		55	82		<2.0
10		.17	.52	4913.28	520	280	300		56	85		<2.0
11		.16	.49	4914.78	—	280	300		55	85		<2.0
12		.11	.33	4916.165	—	280	300		55	88		<2.0
Average		.20	.65	—	510	—						

METER VOL. END 4916.165

START 4875.678

SAMPLE VOL. 42.408 ft^3

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.16" H$_2$O	29.40

Percent O$_2$ =

METER CORR 1.0516

Nomograph Setup

P$_{meter}$ =

P$_{stack}$ =

T$_{meter}$ =

ΔH$_g$ =

% H$_2$O = 4.1

C =

T$_{stack}$ =

ΔP =

Noz(Ideal)=

Noz(Actual)= .316

= .62

.60

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	125	-	100	=	25
#2	106	-	100	=	6
#3	0	-	0	=	0
				Total	31
#4	g(End)		g(Start)		Δgrams
Silica Gel	152	-	145	=	7
				Total Vol. H$_2$O	38 ml

PARTICULATE

DATA

Sampling Time Per Point, Min
4.0

Leak Check Rate

	Vac in. Hg	ft³/min
Before		
After		

ISOKINETICS = 106 %

TEST NUMBER 2
DATE 4-30-79
OPERATOR RAP + JO
FUEL OIL
SITE I
PROBE LOCATION STACK-#3

Sample Point	Time	METER CONDITIONS ΔPs	ΔH	Meter Reading	TEMPERATURES, °F Stack	Probe	Oven	Impingers In	Impingers Out	Meter	O₂, %	Vac.
E-1	11:25	.76	.78	4919.31	605	280	230		58	80		4.7
2		.59	.60	4921.62	580	290	220		62	70		3.8
3		.17	.17	4922.85	570	270	230			70		<2.0
4		.25	.25	4924.45	590	270	230			70		2.0
5		.31	.32	4926.25	595	265	235			71		2.6
6		.40	.41	4928.19	605	250	250			71		3.0
7		.21	.21	4929.55	600	250	250			71		2.0
8		.18	.18	4930.82	590	250	250			71		<2.0
9		.22	.22	4932.40	585	240	255			72		2.2
10		.24	.24	4933.87	580	240	260			74		2.2
11		.18	.18	4935.74	—	235	240			75		<2.0
12		.15	.15	4936.418	—	240	250			76		<2.0
N-1		.38	.36	4938.21	610	210	215			80		2.7
2		.41	.38	4940.08	610	250	255			75		2.8
3		.39	.36	4941.86	600	265	270			75		2.8
4		.34	.32	4943.62	600	260	285			75		2.7
5		.15	.14	4944.77	580	270	300			77		<2.0
6		.12	.11	4945.77	580	260	270			79		<2.0
7		.27	.25	4947.27	590	240	275			80		2.1
8		.37	.34	4949.99	600	250	305			80		2.9
9		.36	.33	4950.69	590	250	310			78		2.9
10		.36	.33	4952.44	585	250	305			78		2.9
11		.33	.31	4954.41	—	250	300			80		2.8
12		.31	.29	4955.660	—	255	295			79		2.5
Average		.31	.30		592							

METER CORR 1.0516

METER VOL. END 4955.660
START 4916.517
SAMPLE VOL. 41.1[illegible]3 → CORR

Cpitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.22" H₂O	29.51

Percent O₂ =

Nomograph Setup

Fmeter =
Pstack =
Tmeter =
ΔHg =
% H₂O =
C =
Tstack =
ΔP =
Noz(Ideal) = .246
Noz(Actual) = 1/4

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
#1	152	-	100	=	52
#2	108	-	100	=	8
#3	0	-	0	=	0
			Total		60
#4 Silica Gel	g(End) 153	-	g(Start) 145	=	Δgrams 8

Total Vol. H₂O 68 ml

1.8

PARTICULATE

DATA

Leak Check Rate

	Vac in. Hg	ft³/min
Before		
After		

Sampling Time Per Point, Min
4.0

ISOKINETICS = 100.5,

TEST NUMBER 3
DATE 5-1-79
OPERATOR R.AP + JO
FUEL OHP
SITE I
PROBE LOCATION STACK-#3

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O₂,%	Vac.
		ΔPs	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
E-1	9:55	.53	1.5	4960.95	615	260	220		40	75		2.8
2		.23	.67	4963.42	610	320	230		40	74		<2.0
3		.69	1.90	4967.47	630	330	255		42	80		3.2
4		.81	2.30	4971.69	635	330	275		60	86		3.5
5		.75	2.2	4975.97	640	330	290		57	88		3.5
6		.58	1.65	4980.64	620	315	315		58	90		2.8
7		.27	.78	4982.22	620	315	320		57	97		<2.0
8		.24	.68	4984.52	625	275	315		62	102		<2.0
9		.14	.37	4986.28	620	275	320		58	102		<2.0
10		.14	.37	4987.90	615	280	315		59	102		<2.0
11		.14	.37	4989.59	—	270	315		59	110		<2.0
12		.09	.26	4991.00	—	270	320		58	110		<2.0
N-1		.36	1.00	4993.83	630	235	300		53	118		2.2
2		.41	1.20	4996.91	640	270	300		55	118		2.3
3		.43	1.15	4999.92	640	280	300		55	120		2.3
4		.49	1.40	5003.27	640	275	305		55	120		2.6
5		.07	.20	5004.44	595	275	300		60	122		<2.6
6		.28	.80	5006.90	630	280	300		60	125		<2.0
7		.33	.90	5009.54	640	280	295		60	125		<2.0
8		.38	1.00	5012.35	635	280	290		60	128		2.0
9		.35	.95	5015.01	635	265	295		60	128		2.0
10		.34	.92	5017.68	640	280	290		60	128		<2.0
11		.24	.65	5019.86	—	295	285		61	130		<2.0
12		.14	.38	5021.538	—	315	285		62	130		<2.0
Average		.35	.98	—	628							

METER VOL. END 5021.538
START 4957.363
SAMPLE VOL. 67.486 ft³ — CORR

C pitot	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.24" H₂O	29.85

Percent O₂ =

Nomograph Setup

P meter =
P stack
T meter =
ΔHg =
% H₂O =

C =
T stack =
ΔP =
Noz(Ideal) =
Noz(Actual) = .316

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	170	-	100	=	70
#2	116	-	100	=	16
#3	0	-	0	=	0
				Total	86
#4	g(End)		g(Start)		Δgrams
Silica Gel	165	-	152	=	13
				Total Vol. H₂O	99 ml

PARTICULATE

DATA

Leak Check Rate

Vac in. Hg ft³/min

Before

After

Sampling Time Per Point, Min
4.0

ISOKINETICS = 100.5

TEST NUMBER 4
DATE 5-1-79
OPERATOR RAP
FUEL OHIO
SITE I
PROBE LOCATION STACK #3

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2,%	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
E-1	13:45	.17	.48	5024.47	580	270	230		60	100		<2.0
2		.17	.48	5026.50	580	310	240		58	100		<2.0
3		.81	2.2	5030.72	610	305	250		60	102		3.7
4		.21	.57	5032.95	585	310	270		61	102		<2.0
5		.24	.65	5035.33	595	290	280		61	103		<2.0
6		.14	.38	5037.09	595	275	290		62	105		<2.0
7		.22	.60	5039.34	610	275	295		62	108		<2.0
8		.22	.60	5041.51	615	260	295		62	110		<2.0
9		.24	.65	5043.82	610	270	295		62	110		<2.0
10		.28	.75	5046.38	615	290	295		62	111		<2.0
11		.25	.68	5048.67	—	250	300		67	111		<2.0
12		.19	.53	5050.80	—	265	310		62	112		<2.0
N-1		.12	.32	5052.49	660	230	275		72	110		<2.0
2		.12	.32	5054.19	615	310	310		62	110		<2.0
3		.13	.34	5055.81	610	320	320		65	111		<2.0
4		.13	.34	5057.53	610	320	315		62	112		<2.0
5		.16	.42	5059.46	615	305	315		65	113		<2.0
6		.18	.47	5061.42	610	285	315		62	113		<2.0
7		.32	.85	5064.04	610	285	310		68	115		2.2
8		.44	1.15	5067.09	610	280	310		63	115		2.6
9		.47	1.25	5070.29	610	260	315		65	115		2.7
10		.48	1.30	5073.46	620	270	305		65	117		2.7
11		.55	1.45	5076.78	—	285	305		65	120		2.9
12		.34	.90	5079.486	—	285	295		68	120		2.2
Average		.274	.74	—	605	—	—	—	—	—	—	

METER VOL. END 5079.486
START 5022.414
SAMPLE VOL. 60.017 ft³ CORR

METER CORR 1.0516

Nomograph Setup

P_{meter} =
P_{stack} =
T_{meter} =
ΔH_g =
% H_2O =
C =
T_{stack} =
ΔP =
Noz(Ideal)=
Noz(Actual)=
=

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.25" H_2O	29.85

Percent O_2 =

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	170	-	100	=	70
#2	112	-	100	=	12
#3	0	-	0	=	0
				Total	82
#4	g(End)		g(Start)		Δgrams
Silica Gel	142.5	-	128	=	14.5
				Total Vol. H_2O	96.5 ml

PARTICULATE

DATA

Leak Check Rate

Vac in. Hg ft^3/min

Before

After

Sampling Time Per Point, Min
3.0

ISOKINETICS = 98.5.

TEST NUMBER 5

DATE 5-2-79

OPERATOR RAP

FUEL #4[?]10

SITE I -

PROBE LOCATION STACK - #3

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O_2,%	Vac.
		ΔP_s	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
E-1	10:25	.16	.43	5084.24	525	220	220			70		<2.0
2		.17	.49	5085.80	535	260	220			68		<2.0
3		.19	.57	5087.54	540	275	220			70		<2.0
4		.18	.53	5089.28	550	280	230			72		<2.0
5		.16	.43	5090.72	550	270	235			75		<2.0
6		.11	.32	5092.10	555	260	240			76		<2.0
7		.11	.32	5093.39	560	265	235			80		<2.0
8		.16	.43	5094.84	565	260	245			81		<2.0
9		.19	.57	5096.55	565	250	240			82		2.0
10		.22	.64	5098.40	535	245	240			82		2.2
11		.22	.64	5100.21	—	250	240			86		2.2
12		.16	.43	5101.63	—	250	250			83		<2.0
N-1	11:14	.07	.20	5102.66	545	220	220			91		<2.0
2		.07	.20	5103.65	550	220	220			92		<2.0
3		.07	.20	5104.58	560	270	235			92		<2.0
4		.07	.18	5105.50	565	255	235			92		<2.0
5		.08	.20	5106.49	555	255	240			91		<2.0
6		.09	.22	5107.44	565	255	245			92		<2.0
7		.22	.55	5109.06	560	260	250			94		<2.0
8		.36	.92	5111.18	560	270	250			96		2.7
9		.46	1.20	5113.50	555	270	265			98		3.2
10		.55	1.40	5115.97	560	270	270			98		3.5
11		.57	1.45	5118.48	—	280	265			99		3.6
12		.41	1.05	5120.619	—	280	250			100		2.8
Average		.21	.56	—	553							

METER VOL. END 5120.619

START 5082.593

SAMPLE VOL 39.988 ft^3

C_{pitot}	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.24" H_2O	29.78

Percent O_2 =

METER CORR 1.0516

Nomograph Setup

P_{meter} =

P_{stack} =

T_{meter} =

$\Delta H_@$ =

% H_2O =

C =

T_{stack} =

ΔP =

Noz(Ideal) =

Noz(Actual) = .316

=

Imp.	Vol. (End)		Vol. (Start)		ΔVol. (ml)
#1	143	-	160	=	43
#2	105	-	160	=	5
#3	0	-	0	=	0
				Total	48
#4	g(End)		g(Start)		Δgrams
Silica Gel	139	-	130	=	9
				Total Vol. H_2O	57 ml

PARTICULATE

DATA

Sampling Time Per Point, Min
4.0

Leak Check Rate

	Vac in. Hg	ft^3/min
Before		
After		

ISOKINETICS = 100.6

TEST NUMBER 10

DATE 5-12-79

OPERATOR RAP

FUEL Kentucky

SITE I

PROBE LOCATION STACK-#3

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$,%	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
E-1	10:10	.09	.26	5125.62	515	250	260			80		<2.0
2		.11	.32	5127.39	520	290	250			82		<2.0
3		.14	.41	5129.29	530	295	270			82		<2.0
4		.17	.50	5131.48	525	290	275			88		2.2
5		.11	.32	5133.19	505	285	285			90		<2.0
6		.09	.26	5134.64	495	250	270			91		<2.0
7		.12	.36	5136.47	495	255	265			90		<2.0
8		.14	.41	5138.37	520	260	280			92		<2.0
9		.16	.47	5140.33	545	250	295			97		<2.0
10		.17	.50	5142.40	535	230	240			93		2.0
11		.17	.50	5144.16	—	250	255			97		2.2
12		.13	.38	5146.28	—	245	255			99		<2.0
N-1		.05	.15	5147.39	490	220	300			98		<2.0
2		.04	.12	5148.42	505	250	295			100		<2.0
3		.04	.12	5149.47	490	275	310			100		<2.0
4		.04	.12	5150.49	500	280	310			100		<2.0
5		.04	.12	5151.52	520	290	290			102		<2.0
6		.06	.18	5152.69	525	290	270			103		<2.0
7		.16	.46	5154.64	530	280	265			105		2.0
8		.21	.61	5156.94	520	280	300			105		2.3
9		.26	.76	5159.49	525	280	255			108		2.7
10		.29	.85	5162.22	510	295	270			108		2.8
11		.28	.82	5164.76	—	300	270			109		2.8
12		.21	.61	5167.038	—	320	300			112		2.3
Average		.136	.40	—	515	—						

METER CORR 1.0516

METER VOL. END 5167.038

START 5124.208

SAMPLE VOL. 45.040 — CORR

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.21" H$_2$O	29.62

Percent O$_2$ =

Nomograph Setup

P$_{meter}$ =

P$_{stack}$ =

T$_{meter}$ =

ΔH$_g$ =

% H$_2$O =

C =

T$_{stack}$ =

ΔP =

Noz(Ideal)=

Noz(Actual)= .316

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	143	-	100	=	43
#2	107	-	100	=	7
#3	0	-	0	=	0
				Total	50
#4	g(End)		g(Start)		Δgrams
Silica Gel	139	-	130	=	9

Total Vol. H$_2$O 59 ml

PARTICULATE

DATA

Leak Check Rate

	Vac in. Hg	ft³/min
Before		
After		

Sampling Time Per Point, Min
3

ISOKINETICS = 100.5%

TEST NUMBER 14
DATE 5-14-79
OPERATOR JD
FUEL KENTUCKY
SITE I
PROBE LOCATION STACK #3

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O₂,%	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
E-1												
2		.25	.75	5169.21	540	270	300			80		4.0
3		.25	.75	5171.21	540	300	300			82		4.0
4		.27	.80	5173.24	545	310	305			80		4.2
5		.23	.67	5175.04	545	320	320			90		3.7
6		.18	.55	5176.89	540	300	280			93		3.4
7		.18	.55	5178.46	540	300	295			98		3.5
8		.20	.60	5180.21	540	285	300			92		3.5
9		.24	.70	5182.09	560	290	300			95		4.0
10		.25	.75	5184.99	560	250	280			100		4.0
11		.26	.77	5186.06	—	270	275			102		4.0
12		.25	.75	5188.95	—	290	290			102		2.5
N-1	30sec.	.12	.32	5189.52	540	220	250			110		2.0
2		.12	.30	5190.71	535	250	250			110		2.0
3		.12	.30	5192.98	540	260	250			110		2.0
4		.11	.27	5193.16	535	280	280			110		2.0
5		.11	.27	5194.33	540	285	295			110		2.5
6		.14	.36	5195.63	550	280	290			110		3.5
7		.26	.67	5197.45	560	280	280			111		4.9
8		.40	1.00	5199.58	560	280	280			112		6.7
9		.52	1.31	5202.02	550	270	260			115		7.5
10		.60	1.52	5204.65	560	270	260			118		7.0
11		.64	1.65	5207.44	—	290	300			118		6.0
12		.55	1.40	5209.90	—	290	250			115		—
Average		.27	.74	—	546							

METER CORR 1.0516

METER VOL. END 5209.90
START 5167.21
SAMPLE VOL. 44.893 – CORR

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.24" H₂O	29.61

Percent O₂ =

Nomograph Setup

P$_{meter}$ =
P$_{stack}$
T$_{meter}$ =
ΔHg =
% H₂O =

C =
T$_{stack}$ =
ΔP =
Noz(Ideal) =
Noz(Actual) = .316

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	146	-	100	=	46
#2	108	-	100	=	8
#3	0	-	0	=	0
				Total	54
#4	g(End)		g(Start)		Δgrams
Silica Gel	140	-	130	=	10

Total Vol. H₂O 64 ml

PARTICULATE

DATA

Leak Check Rate

Vac
in. Hg ft^3/min

Before

After

Sampling Time Per Point, Min
4.0

ISOKINETICS = 100.0%

TEST NUMBER 15
DATE 5-22-79
OPERATOR R.AP
FUEL KENT.
SITE I
PROBE LOCATION STACK-#3

Sample Point	Time	METER CONDITIONS			TEMPERATURES, °F						O$_2$,%	Vac.
		ΔP$_s$	ΔH	Meter Reading	Stack	Probe	Oven	Impingers In	Impingers Out	Meter		
E-1		.28	1.52	5216.92	585	265	255		—	55		2.4
2	10:15	.32	1.73	5220.93	585	320	270		—	62		3.2
3		.19	1.02	5224.48	570	310	275		—	62		3.3
4		.19	1.02	5227.55	580	290	280		70	62		2.4
5		.17	.90	5230.50	595	285	285		70	63		2.7
6		.19	1.02	5233.59	605	280	295		68	65		3.2
7		.18	.97	5236.59	590	270	305		63	65		3.2
8		.21	1.15	5239.93	580	255	310		65	62		3.7
9		.23	1.25	5243.41	575	265	310		65	65		3.8
10		.26	1.35	5246.86	570	270	310		65	65		4.0
11		.24	1.25	5250.28	570	275	310		65	65		3.8
12		.21	1.1	5252.28	—	270	315		64	67		3.5
N-1		.08	.42	5255.20	565	250	270		58	69		2.3
2		.09	.47	5257.29	570	285	285		59	69		2.5
3		.13	.64	5259.58	585	305	300		60	69		2.9
4		.13	.64	5262.93	600	310	300		60	69		3.1
5		.16	.77	5264.54	610	305	260		59	69		4.7
6		.16	.77	5267.22	600	300	285		60	70		4.8
7		.29	1.40	5270.70	590	290	260		60	70		5.5
8		.41	2.00	5274.97	580	270	270		62	70		6.8
9		.58	2.8	5279.92	575	270	260		62	70		8.8
10		.61	3.00	5285.06	—	270	250		62	68		9.3
11		.53	2.60	5289.82	595	260	255		62	67		8.8
12		.47	2.3	5294.396	—	270	260		65	70		9.2
Average		.26	1.33	—	584							

METER VOL. END
START 5213.181
SAMPLE VOL. 85.496 ft^3

C$_{pitot}$	Stack Press. In. Hg-Gauge	Barometric Pressure
.837	-.32" H$_2$O	29.75

Percent O$_2$ =

Nomograph Setup

P$_{meter}$ =
C =
P$_{stack}$ =
T$_{stack}$ =
T$_{meter}$ =
ΔP =
ΔH$_g$ =
Noz(Ideal) =
% H$_2$O =
Noz(Actual) = .379

Imp.	Vol.(End)		Vol. (Start)		ΔVol.(ml)
#1	168	-	100	=	68
#2	132	-	100	=	32
#3	0	-	0	=	0
				Total	100
#4	g(End)		g(Start)		Δgrams
Silica Gel	178	-	150	=	28
				Total Vol. H$_2$O	128 ml

PARTICULATE LAB WORKSHEET

TEST NO. 1 (Inlet, Outlet) LOCATION Site I

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			5	42	1		
DATE WT.			4-29-79	4-28-79	.7404		
TARE WT.	1		95.5672	10.3682	.7409		
	2		95.5679	10.3674	.7408		
	3		95.5680	10.3683	—		
	4		—	—	—		
AVG.			95.5677	10.3680	.7407		

POST TEST WTS.

	1		95.8033	10.4725	.~~8605~~		
	2		95.8024	10.4722	.~~8650~~		
	3		95.8000	10.4718	.8560		
	4		—	—	.8572		
AVG.			95.8019	10.4722	.8566		
Δ WT.			0.2342	0.1042	0.1159		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 454.3 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 2 (Inlet, Outlet) LOCATION Site I

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)
Final ______
Initial ______
Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			6	1	2		
DATE WT.			4-29-79	4-29-79	4-25-79		
TARE WT.	1		104.3478	50.2947	.7932		
	2		104.3485	50.2948	.7932		
	3		104.3484	50.2949	.7934		
	4		—	—	—		
AVG.			104.3482	50.2948	.7933		
POST TEST WTS.							
	1		104.9529	51.4628	~~1.0395~~		
	2		104.9532	51.4636	~~1.0443~~		
	3		104.9519	51.4625	1.0367		
	4		—	—	1.0366		
AVG.			104.9527	51.4630	1.0366		
Δ WT.			0.6045	1.1682	0.2433		

Δ Vlc = ______ ml LOAD ______ klb/hr

Δ DgV = ______ ft^3 O_2 ______ %

Δ Mn 2016.0 mgm REMARKS: ______

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 3 (Inlet, Outlet)
LOCATION Site I
Date
Box No.
Eng.
Test Description

Dry Gas Meter Vol (ft^3)
Final
Initial
Δ DgV

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			7	4	3		
DATE WT.			4-29-79	4-29-79	4-25-79		
TARE WT.	1		97.7637	64.5808	.7376		
	2		97.7636	64.5805	.7371		
	3		97.7636	64.5805	.7372		
	4		—	—	—		
AVG.			97.7636	64.5806	.7373		
POST TEST WTS.							
	1		98.1659	65.8273	~~1.0048~~		
	2		98.1661	65.8277	1.0067		
	3		98.1666	65.8261	1.0070		
	4		—	—	—		
AVG.			98.1662	65.8270	1.0068		
Δ WT.			0.4026	1.2464	0.2695		

Δ Vlc = ml
Δ DgV = ft^3
Δ Mn 1918.5 mgm
LOAD klb/hr
O_2 %
REMARKS:

PARTICULATE LAB WORKSHEET

TEST NO. 4 (Inlet, Outlet) LOCATION Site I

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			8	2	4		
DATE WT.			5-2-79	5-1-79	4-25-79		
TARE WT.	1		104.4547	50.3043	.7930		
	2		104.4545	50.3041	.7929		
	3		104.4547	50.3040	.7930		
	4		—	—	—		
AVG.			104.4546	50.3041	.7930		

POST TEST WTS.

	1		104.6728	51.5256	~~1.0837~~		
	2		104.6710	51.5262	1.0772		
	3		104.6708	51.5247	1.0752		
	4		—	—	—		
AVG.			104.6715	51.5255	1.0762		
Δ WT.			0.2169	1.2214	0.2832		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 1721.5 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 5 (Inlet, Outlet) LOCATION Site I

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			13	3	5		
DATE WT.			—	5-1-79	4-25-79		
TARE WT.	1		105.2124	50.1571	.8000		
	2		105.2119	50.1568	.7998		
	3		105.2107	50.1568	.7999		
	4		—	—	—		
AVG.			105.2117	50.1569	.7999		

POST TEST WTS.

	1		105.4706	50.7359	~~.9902~~		
	2		105.4698	50.7353	.9829		
	3		105.4701	50.7360	.9832		
	4		—	—	—		
AVG.			105.4702	50.7357	.9830		
Δ WT.			0.2585	0.5788	.1831		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 1020.4 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 10 (Inlet, Outlet) LOCATION Site I

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			14	12	6		
DATE WT.			—	—	—		
TARE WT.	1		.-2.1436	95.9785	.8491		
	2		102.1435	95.9780	.8490		
	3		102.1426	95.9773	.8490		
	4		—	—	—		
AVG.			102.1432	95.9779	.8490		
POST TEST WTS.							
	1		102.3936	96.2636	.9702		
	2		102.3936	96.2649	.9702		
	3		102.3933	96.2646	.9697		
	4		—	—	—		
AVG.			102.3935	96.2644	.9700		
Δ WT.			0.2503	0.2865	0.1480		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 684.8 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

8830-5 rev.

PARTICULATE LAB WORKSHEET

TEST NO. 14 (Inlet, Outlet)

LOCATION Site I - #3 BLR

Date 5-14-79

Box No. ________

Eng. ________

Test Description ________

Dry Gas Meter Vol (ft^3)

Final ________

Initial ________

Δ DgV ________

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			20	15	7		
DATE WT.			—	—	—		
TARE WT.	1		95.5720	50.3050	.8581		
	2		95.5716	50.3046	.8584		
	3		95.5716	50.3046	.8584		
	4		—	—	—		
AVG.			95.5717	50.3047	.8583		

POST TEST WTS.

	1		95.7067	51.4448	1.0136		
	2		95.7079	51.4448	1.0137		
	3		95.7074	51.4451	1.0125		
	4		—	—	—		
AVG.			95.7073	51.4449	1.0125		
Δ WT.			0.1356	1.1402	0.1542		

Δ Vlc = ________ ml

Δ DgV = ________ ft^3

Δ Mn 1430.0 mgm

LOAD ________ klb/hr

O_2 ________ %

REMARKS: ________

PARTICULATE LAB WORKSHEET

TEST NO. 15 (Inlet, Outlet) LOCATION Site I

Date ______ Box No. ______ Eng. ______

Test Description ______

Dry Gas Meter Vol (ft^3)

Final ______

Initial ______

Δ DgV ______

Impinger Water Vol (ml)

	1	2	3	Total
Final				
Initial				
Δ Vlc				

CONTENT		H_2O RINSE	ACETONE RINSE	DRY FLASK	FILTER NO.	BLANK NO.	
BOTTLE NO.			—	—	—		
BEAKER NO.			24	21	8		
DATE WT.			—	—	—		
TARE WT.	1		95.5710	50.2967	.8482		
	2		95.5718	50.2968	.8484		
	3		95.5722	50.2968	.8485		
	4		—	—	—		
AVG.			95.5717	50.2968	.8484		
POST TEST WTS.							
	1		95.9503	53.0987	1.2991		
	2		95.9488	53.0989	1.2993		
	3		95.9486	53.1015	1.2987		
	4		—	—	—		
AVG.			95.9492	53.0997	1.2990		
Δ WT.			0.3775	2.8029	0.4506		

Δ Vlc = ______ ml

Δ DgV = ______ ft^3

Δ Mn 3631.0 mgm

LOAD ______ klb/hr

O_2 ______ %

REMARKS: ______

SECTION 3.0

GASEOUS DATA

PAGE

3.1 GASEOUS EMISSION SUMMARY 51

3.2 GASEOUS EMISSION DATA 53

3.3 SOx DATA SHEETS 67

GASEOUS EMISSION SUMMARY

Location: ABMA TEST SITE I

Fuel: Ohio Coal

TEST NO.	DATE	LOAD %	CONDITIONS	STACK										SO$_2$ ppm Dry	SO$_3$ ppm Dry	NOTES
				O$_2$ % Dry	CO$_2$ % Dry	CO ppm Dry	NO ppm Dry	NO$_2$ ppm Wet	HC ppm Wet	O$_2$ % Dry	CO$_2$ % Dry	CO ppm Dry	NO ppm Dry			
01	4-28-79	50.5	as found	11.8	7.6		179									part
02	4-30-79	97.8	as found	8.3	11.3		157									
03	5-1-79	103.1	high OFA	8.3	11.0		294									
04	5-1-79	100.0	low O$_2$, high OFA	6.6	11.6		225									
05	5-2-79	81.6	as found	8.9	10.2		212									
06	5-8-79	98.5	as found	6.1	12.5		185									SASS sizing
07A	5-9-79	103.9	high O$_2$	7.2	12.1		238									gaseous
07B	5-9-79	103.9	med O$_2$	6.1	12.7		210									
07C	5-9-79	103.9	low O$_2$	5.0	13.5		208									
08A	5-9-79	71.8	high O$_2$	9.9	9.5		252									
08B	5-9-79	71.8	normal O$_2$	8.6	10.8		243									
08C	5-9-79	71.8	med O$_2$	7.6	11.3		242									
08D	5-9-79	71.8	low O$_2$	6.8	11.9		229									
09	5-10-79	101.9	as found	5.9	12.9		217							1865	27	SASS / SOx
10	5/12/79	50.3	as found	11.6	8.0		245									
14	5/14/79	71.4	as found	10.1	9.3		213									

NOTE: All parts per million (ppm) figures are corrected to a 3% O$_2$ constant dilution factor

#15900

GASEOUS EMISSION SUMMARY

Location: Test Site I

Fuel: Kentucky

				Stack												
TEST NO.	DATE	LOAD %	CONDITIONS	O_2 % Dry	CO_2 % Dry	CO ppm Dry	NO ppm Dry	NO_2 ppm Wet	HC ppm Wet	O_2 % Dry	CO_2 % Dry	CO ppm Dry	NO ppm Dry	SO_2 ppm Dry	SO_3 ppm Dry	NOTES
15	5/22/79	100	optimum O_2 + OFA	7.6	11.7		175									
16A	5/23/79	100	varying O_2	10.1	10.9		191									
16B				8.7	11.5		180									
16C				7.8	12.2		164									
16D				6.6	13.0		156									
16E				5.9	13.6		149									
18	5/23/79	100	high OFA	7.8	11.0		188							962	6	SO_x

NOTE: All parts per million (ppm) figures are corrected to a 3% O_2 constant dilution factor

#15900

REV

KVB

GASEOUS EMISSIONS DATA

TEST SITE I

TEST NO 1

DATE 4/28/79

FUEL OHio

LOAD 50% 35 Klb/hr.

CONDITIONS As found

DATA TAKEN BY JEC

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
StackN	10:40	11.25	8.0			83	153									Wet Bulb 45°F
StackN	11:00	11.75	7.2			90	175									Dry Bulb 47°F
StackN	11:15	12.5	7.0			85	180									
Stack Eport	11:40	11.5	7.6			87	165									Pbar 29.43
Stack Eport	11:55	12.25	7.2			98	202									
Stack Eport	12:10	12.25	7.2			98	202									
Stack Eport	12:27	11.25	8.1			100	185									
Stack Eport	12:40	11.25	8.2			90	166									

AVERAGES

W port		11.8	7.4	▨		▨	169	▨		▨		▨		▨		
E port		11.7	7.7	▨		▨	184	▨		▨		▨		▨		
Avg		11.8	7.6	▨		▨	179	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE ABMA Site I
TEST NO 2
DATE 4/30/79

FUEL OHIO Coal
LOAD 100% 70K lb/hr
CONDITIONS As Found
DATA TAKEN BY JEC

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack N	11:30	9.0	10.6			80	120									
Stack N	12:00	9.0	10.6			130	195									
Stack N	12:15	6.75	12.8			130	164									
Stack N	12:30	6.0	13.0			120	144									
Stack E	12:45	8.25	11.2			130	184									
Stack E	13:00	8.25	11.4			110	155									
Stack E	13:15	7.0	12.4			87	112									
Stack E	13:30	9.5	10.6			92	144									
Stack E	13:45	10.2	9.3			115	192									

AVERAGES

N		7.7	11.8	▨		▨	156	▨		▨		▨		▨		
E		8.7	11.0	▨		▨	157	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
composite		8.3	11.3	▨		▨	157	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I
TEST NO 3
DATE 5/1/79

FUEL Ohio Coal
LOAD 100% 70 klb/hr.
CONDITIONS High OFA
DATA TAKEN BY JEC

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET) NOx		NO		NO_2		HC		REMARKS
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack E	10:00	7.5	11.6			175	233									
Stack	10:15	8.5	10.4			220	317									Pbar 29.88
Stack	10:30	10.0	9.6			270	442									Abient temp
Stack	10.45	8.8	10.5			220	324									Dry 47°F
																wet 43°F
Stack N	11.15	8.25	11.2			180	254									
Stack	11:30	7.8	16.5			170	232									
Stack	11:45	78	11.5			210	286									
Stack	12.00	8.0	11.5			190	263									

AVERAGES

E		87	10.5	▨		▨	324	▨		▨		▨		▨		
N		8.0	11.4	▨		▨	259	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
Composite		8.3	11.0	▨		▨	294	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE ABMA Site I
TEST NO 4
DATE 5/1/79
FUEL Ohio
LOAD 100%
CONDITIONS Low O_2 High OFA
DATA TAKEN BY SEC

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET) NOx		NO		NO_2		HC		REMARKS
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
E Stack	14:15	6.8	12.0			120	152									Ambient T
Stack	14:30	5.8	12.2			150	178									Dry 61°F
																wet 50°F
Stack	14:45	5.8	12.2			170	201									
																Pbar
																29.84
Stack N	15:00	6.4	11.6			190	234									
Stack	15:15	7.2	11.1			200	261									
Stack	15:30	6.5	10.0			190	274									
Stack	15:40	6.0	12.2			220	264									
Stack	15:50	6.5	11.6			190	226									

AVERAGES

E		6.1	12.1	▨		▨	177	▨		▨		▨		▨		
N		6.9	11.3	▨		▨	254	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
[illegible]		6.6	11.6	▨		▨	225	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I
TEST NO 6
DATE 5-8-79

FUEL Ohio
LOAD 70Klbs/hr
CONDITIONS as found
DATA TAKEN BY

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
																Pbar - 29.47
Stack	320	6.2	12.2			150	183									
stack	400	6.0	12.8			155	186									

AVERAGES

				▨		▨		▨		▨		▨		▨		
STACK		6.1	12.5	▨		▨	185	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I
TEST NO #7
DATE May 9-79
FUEL Ohio
LOAD 70 K
CONDITIONS Gassous Boiler #3
DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
ALL	Am															
Stack																
Norm	1100	7.0	12.3			190	245									
Norm		7.2	12.1			195	255									
Lower 1	11 10	7.2	12.0			170	222									
Lower 1	11 20	7.2	12.0			175	229									
Lower 2	1130	6.4	12.5			11[illegible]	207									
Lower 2	1135	6.1	12.8			175	212									
Lower 2	1140	5.8	12.9			178	211									
Lower 2	1145	5.0	13.3			185	208									Air moved up
Lower 2	1150	4.9	13.6			185	207									
Lower 1	1155	6.0	13.0			180	216									
Lower 1	12.05	7.4	11.9			170	225									

AVERAGES

STACK		7.15	12.1	▨		▨	238	▨		▨		▨		▨		High
STACK		6.1	12.7	▨		▨	210	▨		▨		▨		▨		Med
STACK		4.45	13.45	▨		▨	208	▨		▨		▨		▨		Low
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I

TEST NO #8

DATE May 9

FUEL Oil

LOAD 50K

CONDITIONS Gaseous

DATA TAKEN BY MJ

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
ALL																
Stack																
Norm	12.30	9.9	9.5			155	252									
	1244	8.4	11.0			170	243									
	1250	8.5	11.0			172	248									O2 Moved
	1212	8.8	10.4			160	237									Down
	125	7.8	11.2			180	246									gradualy
	130	7.4	11.3			180	239									+ slowly
	135	7.0	11.7			180	232									Lowered Air
	140	6.6	12.0			180	225									Twice
																No Steps

AVERAGES

STACK		9.9	9.5	▨		▨	252	▨		▨		▨		▨		
STACK		8.6	10.8	▨		▨	243	▨		▨		▨		▨		
STACK		7.6	11.3	▨		▨	242	▨		▨		▨		▨		
STACK		6.8	11.9	▨		▨	229	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I

TEST NO 9

DATE 5-10-79

FUEL Ohio

LOAD 70,000 lbs/hr

CONDITIONS high OFA

DATA TAKEN BY JB + MJ

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
STACK	11:30	6.5	12.4			150	186									
	~~115~~															
	1205	5.5	13.6			180	209									
	1210	7.4	12.2			172	226									
	1237	5.3	13.1			180	207									
	1414	5.6	12.8			190	222									SOx #1 & #2
	15:00	5.4	13.3			205	237									SOx # 3
	1520	5.6	13.2			195	228									

AVERAGES

STACK		5.9	12.9	▨		▨	217	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I
TEST NO 10
DATE May 12-79
FUEL Kentucky
LOAD 35K Norm
CONDITIONS as found
DATA TAKEN BY MJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry) unc	CO ppm(dry) cor	NO ppm(dry) unc	NO ppm(dry) cor	HOT LINE SAMPLES, PPM (WET) NOx unc	NOx cor	NO unc	NO cor	NO_2 unc	NO_2 cor	HC unc	HC cor	REMARKS
Stack	1030	13.0	6.0			102.5	232									
	1045	11.8	7.6			130.0	256									
	11 00	11.3	8.8			135.0	252									
	11.15	12.4	7.0			121.3	240									
	1130	12.3	7.2			130.0	271									
	1145	10.0	9.7			157.5	259									
	11.46	10.5	9.2			130.0	224									
	12.00	11.3	8.2			128.8	240									
	1215	11.5	8.2			125.0	238									
	1220	11.5	8.2			125.0	238									

AVERAGES

STACK		11.6	8.0	▨		▨	245	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I
TEST NO 14
DATE May 14

FUEL Kty.
LOAD 50K Norm
CONDITIONS Blr 3
DATA TAKEN BY my

Probe Position	Am Time	O_2 % (dry)	CO_2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack	1053	9.3	9.7			130	201									
	1100	9.8	9.5			125	202									
	1110	9.7	9.6			130	208									
	1115	10.1	9.2			130	215									
	1125	10.7	8.9			140	246									
	1130	10.7	8.9			135	237									
	1140	9.8	9.5			134	216									
	1145	9.4	9.9			125	195									
	1155	9.9	9.2			125	203									Re Cal.
	1200	10.3	9.0			120	203									
	1210	11.0	8.4			125	222									

AVERAGES

				▨		▨		▨		▨		▨		▨		
STACK		10.1	9.3	▨		▨	213	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I
TEST NO #15
DATE May 22 79
RH = 52%   W - 59
D 68

FUEL Kentucky
LOAD 70,000
CONDITIONS optimum O2 and OFA
DATA TAKEN BY MJ

Probe Position	Hr. Time	O_2 % (dry)	CO_2 % (dry)	CO ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NO_x		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stacks																
~~10 20~~	10 20	7.8	12.0			135	184									
	10 30	7.3	12.0			132.5	174									
	1045	6.3	12.8			143.7	176									
	1055	8.7	10.6			124.7	183									
	1100	8.6	10.7			127.4	185									
	1110	7.5	11.7			128.7	172									
	1130	8.4	10.9			111.3	159									Reading
	1140	7.4	11.9			115.0	152									↙
	1150	6.6	12.4			126.3	158									Changed Ports
	1210	9.1	10.4			123.7	188									
	1230	5.8	13.0			145	172									
	1235	7.9	11.4			140	193									

AVERAGES

STACK		7.6	11.7	▨		▨	175	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I

TEST NO 16

DATE 5-23-79

FUEL Kentucky

LOAD 70k

CONDITIONS Vary O_2

DATA TAKEN BY BJ

Probe Position	Time	O_2 % (dry)	CO_2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO_2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
Stack																
B	950	8.7	11.5			122.5	180									Start
B	10.00	9.0	11.3			122.5	184									
B	10.10	8.5	11.8			1225	177									Bi- moved.
																Lower
C	1020	7.8	12.2			1200	164									
D	1030	6.6	13.0			1250	156									
E	1040	5.9	13.6			125.0	149									
B	1050	8.3	12.2			1225	174									
A	11.00	10.1	10.9			115.0	191									

AVERAGES

	A	10.1	10.9				191									
	B	8.7	11.5	▨		▨	180	▨		▨		▨		▨		
STACK	C	7.8	12.2	▨		▨	164	▨		▨		▨		▨		
	D	6.6	13.0	▨		▨	156	▨		▨		▨		▨		
	E	5.9	136	▨		▨	149	▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

KVB

GASEOUS EMISSIONS DATA

TEST SITE I
TEST NO 18
DATE 5-23-79

FUEL Kentucky
LOAD 70,000
CONDITIONS
DATA TAKEN BY [illegible]

Probe Position	Time	O2 % (dry)	CO2 % (dry)	CO · ppm(dry)		NO ppm(dry)		HOT LINE SAMPLES, PPM (WET)								REMARKS
								NOx		NO		NO2		HC		
				unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	unc	cor	
	1242	8.0	11.0	005		145	201									
	13:30	8.6	10.4			140	204									
	1400	8.1	10.9			130	182									TEST A SOx
	1440	7.2	11.8			142	185									TEST B SOx
	1530	8.1	10.9			135	189									Test C SOx
	1545	7.6	11.4			130	175									
	1630	8.8	10.2			138	204									
	1700	8.6	10.4			125	182									
	1710	6.7	13			132	167.									

AVERAGES

STack		7.97	11.03	▨		▨	187.8	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		
		7.97	11.03	▨		▨	187.8	▨		▨		▨		▨		
				▨		▨		▨		▨		▨		▨		

NOTE: Parts per million (ppm) figures are corrected to 3% O_2

Local TEST SITE I

SOx DATA SHEET

Date 5-10-79 Probe Location & Probe Length 24" Stack Temp 612°F

Unit # 3 Fuel Ohio Load 70,000 LB/HR

Test Description: TEST # 9 ΔP = 0.36" H2O

Test No.	Box No.	Sample Time	Meter Temp.(T)	Meter (p)Press.	Meter Reading	(P) Baro. Press.	Port	Purge Time	O2
9A	method 6	16:12	102, 105		0.0	29.56	North	20 min	5.6
			106	0	1.00				
9B	2	13.10	105, 105		0.0	↓	↓	20 min	5.4
			106	0	1.00				
9C	3	13:45	102, 105		0.0			20 min	7.0
			105	0	1.00				

SAMPLED BY

Test # 9A Test # 9B Test # 9C

	9A SO2	9A SO3	9A SOx	9B SO2	9B SO3	9B SOx	9C SO2	9C SO3	9C SOx
Normality N	0.0102			0.0104			0.0104		
Dilution Factor F	12.5			20			10		
Blank B	0			0			0		
Averages									
Ml. of Titrant A	23.5	6.1		16.8	4.5		34.7	4.5	
	23.7			16.5			35.0		
	23.6			17.0			35.2		
Averages	23.6			16.8	4.5		35.0	4.5	
460 + T	564			565			564		
Sample Vol. V	1.00			1.00					
P + p									
A - B									

TITRATED BY

$$SO2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO2 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

SO2 = 1374 SO3 = 25.6

$$SO3 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

SO2 @ 3% O2 = 1607
SO3 @ 3% O2 = 30
SOx @ 3% O2 = 1637

$$SO2 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

SO2 = 1593

$$SO3 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

SO3 = 21.4

SO2 @ 3% O2 = 1839
SO3 @ 3% O2 = 25
SOx @ 3% O2 = 1864

$$SO2 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

SO2 = 1668

$$SO3 = \frac{(\quad)(\quad)(\quad)(\quad)24}{(\quad)(\quad)}$$

SO3 = 21.4

SO2 @ 3% O2 = 2148
SO3 @ 3% O2 = 28
SOx @ 3% O2 = 2176

Local TEST SITE I

SOx DATA SHEET

Date 5/23/79

Probe Length 24" Stack Temp 2 = 635 m#6 = 650 3 = 640

Unit #3 Test #18

Fuel Kentucky

Load 70,000

Test No.	Box No.	Sample Time	Meter Temp.(T)	(P) Meter Press.	Meter Reading	(p) Baro. Press.	Port	Purge Time	O2
18A	2	13.07	65		.0	29.45	North Port	20	8.1
				0	1.00				
18B	m#6	17.00	62		.0	"		20	7.2
				0	1.00				
18C	3	12.17	61		.0	"		20	7.6
				0	1.00				

	Test #			Test #			Test #		
	SO2	SO3	SOx	SO2	SO3	SOx	SO2	SO3	SOx
Normality N	.0104			.0102			.0104		
Dilution Factor F	20	1		5	1		10	1	
Blank B	0			0			0		
Averages									
Ml. of Titrant A	7.4	1.7		38.5	.7		14.6	.7	
	7.4			38.4			14.6		
	7.5			38.5			14.7		
Averages									
460 + T	525			523			521		
Sample Vol. V	1.00			1.00			1.00		
P + p									
A - B									

$$SO2 = \frac{(A-B)(N)(F)(460+T)(24)}{V(P+p)}$$

$$SO2 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 = 925.0 SO3 = 10.6

corr.

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

uncorrected SO2 - 661.5
SO3 - 7.6

$$SO2 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 = 1092.3

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

corr

SO3 = 3.9

836.0
3.0

$$SO2 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

SO2 = 869.7

$$SO3 = \frac{(\ \ )(\ \ )(\ \ )(\ \ )24}{(\ \ )(\ \ )}$$

corr.

SO3 = 4.2

646.2
3.1

SECTION 4.0

PARTICLE SIZE DISTRIBUTION

PAGE

4.1 SASS GRAVIMETRICS 70

SITE I

SASS GRAVIMETRICS

			%	% Passing
Test #9 Ohio Coal	10μ	9.7104	76.57	23.43
	3μ	1.3858	10.93	12.50
	1μ	0.3880	3.06	9.44
	Filter	1.1981	9.45	0
	TOTAL	12.6823	100.01	
Test #18 Kentucky Coal	10μ	10.5443	76.12	23.88
	3μ	1.2289	8.87	15.01
	1μ	0.4275	3.09	11.92
	Filters	0.6164	11.93	0
		0.4853		
		0.5507		
	TOTAL	13.8531	100.01	

SECTION 5.0

FUEL AND ASH ANALYSIS

PAGE

5.1 COMMERCIAL TESTING ANALYSIS 72

5.2 COMBUSTIBLE ANALYSIS 93

5.3 COAL SIEVE ANALYSIS 94

F-462

filed

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 1
Sample: Ohio Coal
Test Site: I

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	4/28/79
Date received	6/23/79

Analysis report no. 71-34524

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	4.08	xxxxx
% Ash	10.09	10.52
% Volatile	37.43	39.02
% Fixed Carbon	48.40	50.46
	100.00	100.00
Btu/lb.	12634	13171
% Sulfur	3.50	3.65

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

72

R. A. Houser

R. A. HOUSER, Manager, Midwest Division

Charter Member

Original Copy Watermarked
For Your Protection

RAH/ br

F-462

field

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

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OFFICE TEL. (312) 264-1173

SINCE 1908

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 2
Sample: Ohio Coal
Test Site: I

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	4/30/79
Date received	6/23/79

Analysis report no. 71-34528

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.76	xxxxx
% Ash	9.05	9.40
% Volatile	38.10	39.59
% Fixed Carbon	49.09	51.01
	100.00	100.00
Btu/lb.	12757	13255
% Sulfur	3.14	3.26

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

KVB
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 3, 1979

Sample identification
by KVB

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	5/1/79
Date received	6/23/79

Test No.:	3
Sample:	Ohio Coal
Test Site:	I

Analysis report no. 71-34533

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.28	xxxxx
% Ash	9.15	9.46
% Volatile	37.96	39.25
% Fixed Carbon	49.61	51.29
	100.00	100.00
Btu/lb.	12881	13318
% Sulfur	2.81	2.91

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

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KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 4
Sample: Ohio Coal
Test Site: I

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	5/1/79
Date received	6/23/79

Analysis report no. 71-34535

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.50	xxxxx
% Ash	10.37	10.75
% Volatile	38.61	40.01
% Fixed Carbon	47.52	49.24
	100.00	100.00
Btu/lb.	12660	13119
% Sulfur	2.83	2.93

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
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KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 5
Sample: Ohio Coal
Test Site: I

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	5/2/79
Date received	6/23/79

Analysis report no. 71-34536

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.69	xxxxx
% Ash	10.58	10.87
% Volatile	38.05	39.10
% Fixed Carbon	48.68	50.03
	100.00	100.00
Btu/lb.	12739	13091
% Sulfur	2.98	3.06

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½ W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
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KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 6
Sample: Ohio Coal
Test Site: I

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	5/8/79
Date received	6/23/79

Analysis report no. 71-34538

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.67	xxxxx
% Ash	9.38	9.64
% Volatile	37.84	38.88
% Fixed Carbon	50.11	51.48
	100.00	100.00
Btu/lb.	13024	13381
% Sulfur	2.28	2.34

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H Cone Height
W Cone Width

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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KVB
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 25, 1979

Sample identification by KVB

Sample
Test Site: I
Test #9

Kind of sample reported to us: Coal

Sample taken at: ----

Sample taken by: KVB

Date sampled: ----

Date received: 6/23/79

Analysis report no. 71-34539

PROXIMATE ANALYSIS

	As Rec'd	Dry Basis
% Moisture	2.96	xxxxx
% Ash	8.37	8.63
% Volatile	38.15	39.31
% Fixed Carbon	50.52	52.06
	100.00	100.00
Btu/lb.	13308	13714
% Sulfur	1.88	1.94

ULTIMATE ANALYSIS

	As Rec'd	Dry Basis
% Moisture	2.96	xxxxx
% Carbon	72.62	74.83
% Hydrogen	4.97	5.12
% Nitrogen	1.26	1.30
% Chlorine	0.40	0.41
% Sulfur	1.88	1.94
% Ash	8.37	8.63
% Oxygen(diff)	7.54	7.77
	100.00	100.00

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. HOUSER, Manager, Midwest Division

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SINCE 1908

KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

August 13, 1979

Sample identification by KVB, Inc.

Kentucky Coal
Site I
Test #10

Kind of sample reported to us	Coal
Sample taken at	Site I
Sample taken by	KVB, Inc.
Date sampled	-----
Date received	-----

Analysis report no. 71- 34541

PROXIMATE ANALYSIS	As Rec'd	Dry Basis
% Moisture	2.47	xxxxx
% Ash	5.23	5.36
% Volatile	39.38	40.38
% Fixed Carbon	52.92	54.26
	100.00	100.00
Btu/lb.	14053	14409
% Sulfur	1.43	1.47

ULTIMATE ANALYSIS	As Rec'd	Dry Basis
% Moisture	2.47	xxxxx
% Carbon	76.57	78.51
% Hydrogen	5.34	5.48
% Nitrogen	1.51	1.55
% Chlorine	0.13	0.13
% Sulfur	1.43	1.47
% Ash	5.23	5.36
% Oxygen(diff)	7.32	7.50
	100.00	100.00

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 14
Sample: Kentucky Coal
Test Site: I

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	5/14/79
Date received	6/23/79

Analysis report no. 71-34542

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.10	xxxxx
% Ash	7.32	7.48
% Volatile	37.87	38.68
% Fixed Carbon	52.71	53.84
	100.00	100.00
Btu/lb.	13558	13849
% Sulfur	1.75	1.79

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

80 R A Houser

R. A. HOUSER, Manager, Midwest Division

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KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 15
Sample: Kentucky Coal
Test Site: I

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	5/22/79
Date received	6/23/79

Analysis report no. 71-34544

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	2.50	xxxxx
% Ash	6.14	6.30
% Volatile	38.38	39.36
% Fixed Carbon	52.98	54.34
	100.00	100.00
Btu/lb.	13687	14038
% Sulfur	1.46	1.50

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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KVB
A Research Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 3, 1979

Sample identification
by KVB

Kentucky Coal

TEST # 18

Kind of sample reported to us	Coal
Sample taken at	----
Sample taken by	KVB
Date sampled	5/24/79
Date received	6/23/79

Analysis report no. 71-34549

PROXIMATE ANALYSIS

	As Received	Dry Basis
%Moisture	1.97	-----
%Ash	5.45	5.56
%Volatile	39.53	40.32
%Fixed Carbon	53.05	54.12
	100.00	100.00
Btu/lb.	13995	14276
%Sulfur	1.33	1.36

ULTIMATE ANALYSIS

	As Received	Dry Basis
Moisture	1.97	xxxxx
Carbon	77.88	79.44
Hydrogen	5.22	5.33
Nitrogen	1.49	1.52
Chlorine	0.13	0.13
Sulfur	1.33	1.36
Ash	5.45	5.56
Oxygen (diff)	6.53	6.66
	100.00	100.00

SULFUR FORMS

	% Weight As Received	% Weight Dry Basis
%Pyritic Sulfur	0.55	0.56
%Sulfate Sulfur	0.02	0.02
%Organic Sul.(dif)	0.76	0.78

Fouling Index = 0.35
Slagging Index = 0.49

MINERAL ANALYSIS

	% Weight Ignited Basis
Silica, SiO_2	42.57
Alumina, Al_2O_3	25.24
Titania, TiO_2	1.59
Ferric oxide, Fe_2O_3	18.87
Lime, CaO	2.99
Magnesia, MgO	0.75
Potassium oxide, K_2O	1.48
Sodium oxide, Na_2O	0.96
Sulfur trioxide, SO_3	3.08
Phos. pentoxide, P_2O_5	0.26
Strontium, SrO	0.18
Barium, BaO	0.36
Manganese oxide, Mn_3O_4	0.02
Undetermined	1.65
	100.00

Alkalies as Na_2O
Dry Coal Basis = 0.11
Silica Value = 65.31
Base:Acid Ratio = 0.36
T_{250} Temperature = 2460°F

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. HOUSER, Manager, Midwest Division

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KVB
A Research Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 24, 1979

		Sample identification by KVB
Kind of sample reported to us	Coal	Kentucky Coal
Sample taken at	----	
Sample taken by	KVB	
Date sampled	5/24/79	
Date received	6/23/79	COMPLETED REPORT

Analysis report no 71-34549 (Page 2 of 2)

FUSION TEMPERATURES OF ASH	Reducing
Initial Def., IT	2065°F
Softening, ST	2235°F
Softening, HT	2415°F
Fluid, FT	2575°F

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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KVB, INC.
A Research-Cottrell Co.
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 17, 1979

Kind of sample reported to us: Ohio Coal Composite

Sample identification by: KVB

Sample taken at: Test Site I

Ohio Coal Composite
Site I

Sample taken by: KVB

Date sampled: ——

Date received: 6/23/79

Analysis report no. 71- 34547

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	3.08	xxxxx
% Ash	10.07	10.39
% Volatile	38.16	39.37
% Fixed Carbon	48.69	50.24
	100.00	100.00
Btu/lb.	12718	13122
% Sulfur	2.95	3.04
% Alk. as Na_2O	xxxxx	0.17
SULFUR FORMS		
% Pyritic Sulfur	1.70	1.75
% Sulfate Sulfur	0.06	0.06
% Organic Sulfur	1.19	1.23
WATER SOLUBLE ALKALIES		
% Na_2O =	xxxxx	——
% K_2O =	xxxxx	——

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	2060 °F	—— °F
Softening (H = W)	2195 °F	—— °F
Softening (H = ½W)	2335 °F	—— °F
Fluid	2465 °F	—— °F

H is Cone Height
W is Cone Width

% EQUILIBRIUM MOISTURE = 4.43
HARDGROVE GRINDABILITY INDEX = 50
FREE SWELLING INDEX = ——

ULTIMATE ANALYSIS	% Weight As received	% Weight Dry basis
Moisture	3.08	xxxxx
Carbon	70.30	72.53
Hydrogen	4.88	5.04
Nitrogen	1.76	1.82
Chlorine	0.16	0.16
Sulfur	2.95	3.04
Ash	10.07	10.39
Oxygen (diff)	6.80	7.02
	100.00	100.00

MINERAL ANALYSIS OF ASH	% Weight Ignited Basis
Silica, SiO_2	38.94
Alumina, Al_2O_3	23.04
Titania, TiO_2	1.22
Ferric oxide, Fe_2O_3	27.22
Lime, CaO	2.39
Magnesia, MgO	0.81
Potassium oxide, K_2O	1.93
Sodium oxide, Na_2O	0.33
Sulfur trioxide, SO_3	1.55
Phos. pentoxide, P_2O_5	0.34
Undetermined	2.14*
	100.00
SILICA VALUE =	56.14
BASE: ACID RATIO	0.52
T_{250} Temperature =	2295 °F

*These ignited basis results were used to calculate undetermined value above

%Strontium oxide, SrO 0.00
%Barium oxide, BaO 0.04
%Manganese oxide, Mn_3O_4................ 0.05
Fouling index.......... 0.17
Slagging index......... 1.52

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COMMERCIAL TESTING & ENGINEERING CO.

84 R. A. HOUSER, Manager, Midwest Division

Charter Member

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OFFICE TEL. (312) 264-1173

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 13, 1979

Kind of sample reported to us	Coal
Sample taken at	Site I
Sample taken by	KVB, Inc.
Date sampled	——
Date received	6/23/79

Sample identification by KVB, Inc.

Kentucky Coal Composite
Site I

Analysis report no. 71- 34546

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	2.32	xxxxx
% Ash	6.46	6.61
% Volatile	37.79	38.69
% Fixed Carbon	53.43	54.70
	100.00	100.00
Btu/lb.	13708	14034
% Sulfur	1.43	1.46
% Alk. as Na_2O	xxxxx	0.12
SULFUR FORMS		
% Pyritic Sulfur	0.65	0.66
% Sulfate Sulfur	0.03	0.03
% Organic Sulfur	0.75	0.77
WATER SOLUBLE ALKALIES		
% Na_2O =	xxxxx	——
% K_2O =	xxxxx	——

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	2075 °F	—— °F
H is Cone Height — Softening (H=W)	2225 °F	—— °F
W is Cone Width — Softening (H=½W)	2365 °F	—— °F
Fluid	2535 °F	—— °F

% EQUILIBRIUM MOISTURE = ——
HARDGROVE GRINDABILITY INDEX = 48
FREE SWELLING INDEX = 4

ULTIMATE ANALYSIS	% Weight As received	% Weight Dry basis
Moisture	2.32	xxxxx
Carbon	76.05	77.86
Hydrogen	5.15	5.27
Nitrogen	1.40	1.43
Chlorine	0.14	0.14
Sulfur	1.43	1.46
Ash	6.46	6.61
Oxygen (diff)	7.05	7.23
	100.00	100.00

MINERAL ANALYSIS OF ASH	% Weight Ignited Basis
Silica, SiO_2	43.98
Alumina, Al_2O_3	23.64
Titania, TiO_2	1.42
Ferric oxide, Fe_2O_3	17.78
Lime, CaO	3.44
Magnesia, MgO	0.79
Potassium oxide, K_2O	1.75
Sodium oxide, Na_2O	0.73
Sulfur trioxide, SO_3	3.64
Phos. pentoxide, P_2O_5	0.28
Undetermined	2.23
	100.00
SILICA VALUE =	66.65
BASE: ACID RATIO	0.35
T_{250} Temperature =	2470 °F

*These ignited basis results were used to calculate undetermined value above
%Strontium oxide, SrO 0.05
%Barium oxide, BaO 0.25
%Manganese oxide, Mn_3O_4 .... 0.02

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

SINCE 1908

KVB, INC.
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

July 13, 1979

Kind of sample reported to us	Coal
Sample taken at	Site I
Sample taken by	KVB, Inc.
Date sampled	——
Date received	6/23/79

Sample identification by KVB, Inc.

Kentucky Coal Composite
Site I

Analysis report no. 71- 34546

PROXIMATE ANALYSIS	As received	Dry basis
% Moisture	2.32	xxxxx
% Ash	6.46	6.61
% Volatile	37.79	38.69
% Fixed Carbon	53.43	54.70
	100.00	100.00
Btu/lb.	13708	14034
% Sulfur	1.43	1.46
% Alk. as Na_2O	xxxxx	0.12
SULFUR FORMS		
% Pyritic Sulfur	0.65	0.66
% Sulfate Sulfur	0.03	0.03
% Organic Sulfur	0.75	0.77
WATER SOLUBLE ALKALIES		
% Na_2O =	xxxxx	——
% K_2O =	xxxxx	——

FUSION TEMPERATURE OF ASH	Reducing	Oxidizing
Initial Deformation	2075 °F	—— °F
Softening (H=W) — H is Cone Height	2225 °F	—— °F
Softening (H=½W) — W is Cone Width	2365 °F	—— °F
Fluid	2535 °F	—— °F

% EQUILIBRIUM MOISTURE = ——
HARDGROVE GRINDABILITY INDEX = 48
FREE SWELLING INDEX = 4

ULTIMATE ANALYSIS	% Weight As received	% Weight Dry basis
Moisture	2.32	xxxxx
Carbon	76.05	77.86
Hydrogen	5.15	5.27
Nitrogen	1.40	1.43
Chlorine	0.14	0.14
Sulfur	1.43	1.46
Ash	6.46	6.61
Oxygen (diff)	7.05	7.23
	100.00	100.00

MINERAL ANALYSIS OF ASH	% Weight Ignited Basis
Silica, SiO_2	43.98
Alumina, Al_2O_3	23.64
Titania, TiO_2	1.42
Ferric oxide, Fe_2O_3	17.78
Lime, CaO	3.44
Magnesia, MgO	0.79
Potassium oxide, K_2O	1.75
Sodium oxide, Na_2O	0.73
Sulfur trioxide, SO_3	3.64
Phos. pentoxide, P_2O_5	0.28
Undetermined	2.23
	100.00
SILICA VALUE =	66.65
BASE: ACID RATIO	0.35
T_{250} Temperature =	2470 °F

*These ignited basis results were used to calculate undetermined value above

%Strontium oxide, SrO 0.05
%Barium oxide, BaO 0.25
%Manganese oxide, Mn_3O_4 .... 0.02

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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RAHouser

R. A. HOUSER, Manager, Midwest Division

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES, INC.
Charter Member

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GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

CTE SINCE 1908

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 1
Sample: Bottom Ash
Site: I

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	4/28/79
Date received	6/23/79

Analysis report no. 71-34525

	Dry Basis
%Ash........................	55.31
%Combustible.................	44.69

Respectfully submitted,
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R. A. HOUSER, Manager, Midwest Division

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CTE
SINCE 1908

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification by KVB

Test No. 2
Sample: Bottom Ash
Site: I

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	4/30/79
Date received	6/23/79

Analysis report no. 71-34529

	Dry Basis
%Ash..........................	75.73
%Combustible.................	24.27

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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SINCE 1908

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification by KVB

Test No. 3
Sample: Bottom Ash
Site: I

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	5/1/79
Date received	6/23/79

Analysis report no. 71-34534

	Dry Basis
%Ash	64.11
%Combustible	35.89

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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OFFICE TEL. (312) 264-1173

CTE
SINCE 1908

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 5
Sample: Bottom Ash
Site: I

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	5/22/79
Date received	6/23/79

Analysis report no. 71-34537

	Dry Basis
%Ash..........................	69.18
%Combustible.................	30.82

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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OFFICE TEL. (312) 264-1173

CTE
SINCE 1908

June 28, 1979

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

Sample identification
by KVB

Test No. 9
Sample: Bottom Ash
Site: I

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34540

	Dry Basis
%Ash........................	64.49
%Combustible................	35.51

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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CTE
SINCE 1908

June 28, 1979

KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

Sample identification
by KVB

Test No. 15
Sample: Bottom Ash
Test Site: I

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34545

	Dry Basis
%Ash..........................	85.86
%Combustible.................	14.14

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R A Houser

R. A. HOUSER, Manager, Midwest Division

American Council of Independent Laboratories, Inc.
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KVB
A Research-Cottrell Company
6176 Olson Memorial Highway
Minneapolis, MN 55422

June 28, 1979

Sample identification
by KVB

Test No. 18
Sample: Bottom Ash

Kind of sample reported to us	Ash
Sample taken at	----
Sample taken by	KVB
Date sampled	----
Date received	6/23/79

Analysis report no. 71-34543

	Dry Basis
%Ash	81.61
%Combustible	18.39

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

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R. A. HOUSER, Manager, Midwest Division

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COMBUSTIBLES DATA SHEET

SITE I

Crucible Number	Sample Origin	Crucible Weight grams	Crucible & Sample Weight Post 110°C gms	Sample Weight grams	Post 750°C grams	Δ Weight grams	% Combus-tibles
42	TEST #1 STACK	10.3682	10.4718	0.1040	10.4480	0.0240	23.0
		10.3674	10.4722		10.4481		
		10.3683	10.4719		—		
	AVG.	10.3680	10.4720		10.4480		
43	TEST #2 STACK	9.8492	11.0053	1.1563	10.5805	0.4249	36.7
		9.8482	11.0057		10.5805		
		9.8490	11.0051		—		
	AVG.	9.8491	11.0054		10.5805		
34	TEST #3 STACK	10.1702	11.4041	1.2341	11.1320	0.2718	22.0
		10.1692	11.4043		11.1324		
		10.1703	11.4035		—		
	AVG.	10.1699	11.4040		11.1322		
20	TEST #4 STACK	8.8402	10.0568	1.2164	9.7477	0.3090	25.6
		8.8399	10.0565		9.7475		
		8.8406	10.0566		—		
	AVG.	8.8402	10.0566		9.7476		
35	TEST #5 STACK	9.8295	10.4076	0.5774	10.2430	0.1645	28.4
		9.8292	10.4070		10.2429		
		9.8301	10.4063		—		
	AVG.	9.8296	10.4070		10.2429		
41	TEST #14 SITE I	9.8826	11.0257	1.1431	10.7073	0.3187	27.8
		9.8828	11.0259		10.7069		
		9.8827	—		—		
	AVG.	9.8827	11.0258		10.7071		
	AVG.						
	AVG.						
	AVG.						
	AVG.						
	AVG.						

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 1

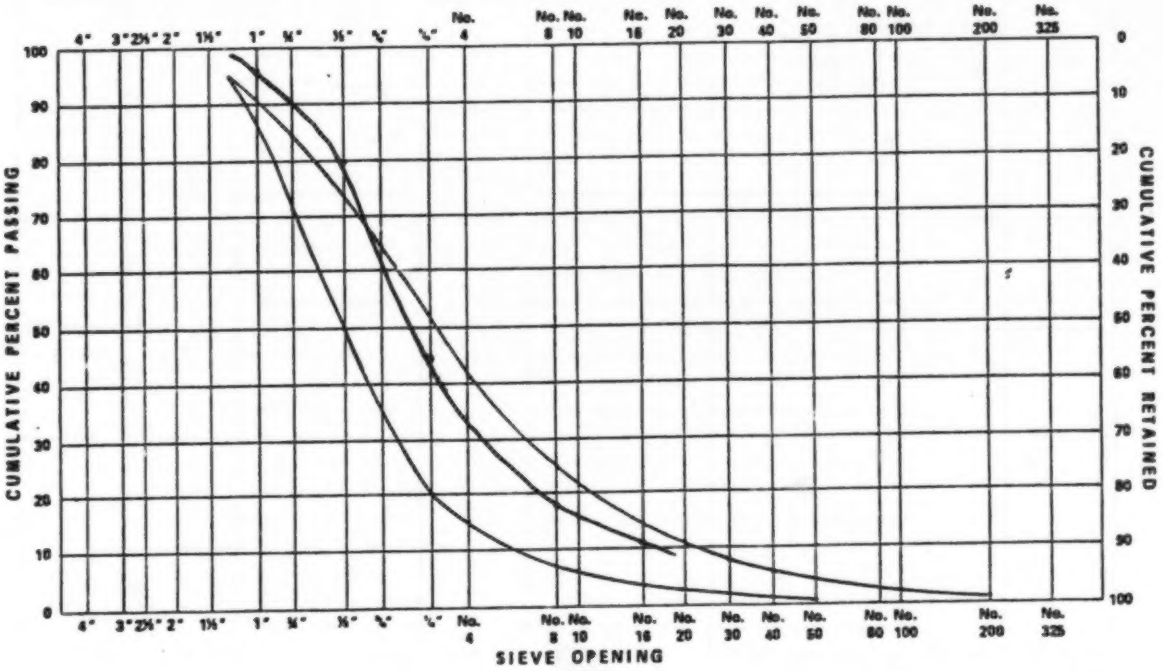
TEST SITE I

SAMPLE IDENTIFICATION Ohio

DATE SAMPLE TAKEN 4-28-79

TEST PERFORMED BY JAB

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.4	442.8	332.4	4.4	7637.8	100.0	5
1"	↓	1330.3	1219.9	16.0	7305.4	95.6	5
$\frac{1}{2}$"		1153.0 1677.3	2610.4	34.2	6085.5	79.6	5
$\frac{1}{4}$"		485.0 1392.8	2157.6	28.2	3475.1	45.4	5
#8		630.5	520.1	6.8	1317.5	17.2	5
#16		907.8	797.4	10.4	797.4	10.4	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 2

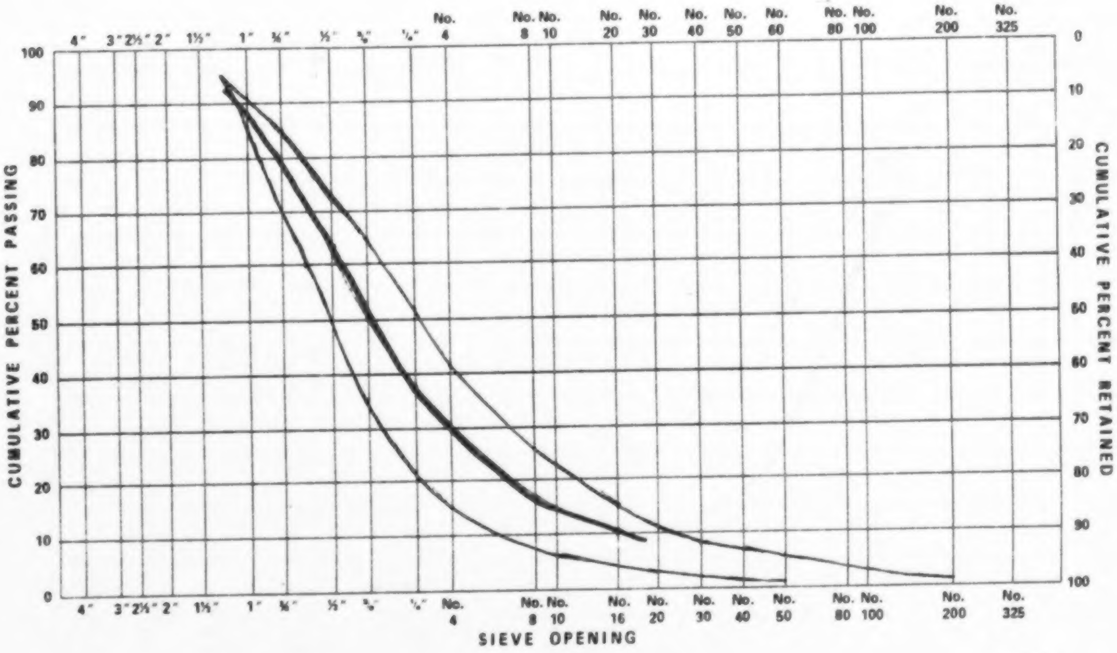
TEST SITE I

SAMPLE IDENTIFICATION Ohio Coal

DATE SAMPLE TAKEN 4-30-79

TEST PERFORMED BY JCB

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.4	1080.4	970.0	12.1	8022.9	100.0	5
1"	↓	758.3 1448.1	1985.6	24.7	7052.9	87.9	5
1/2"		1016.4 1289.8	2085.4	26.0	5067.3	63.2	5
1/4"		844.4 1057.8	1681.4	21.0	2981.9	37.2	5
#8		594.9	484.5	6.0	1300.5	16.2	5
#16	↓	926.4	816.0	10.2	816.0	10.2	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 3

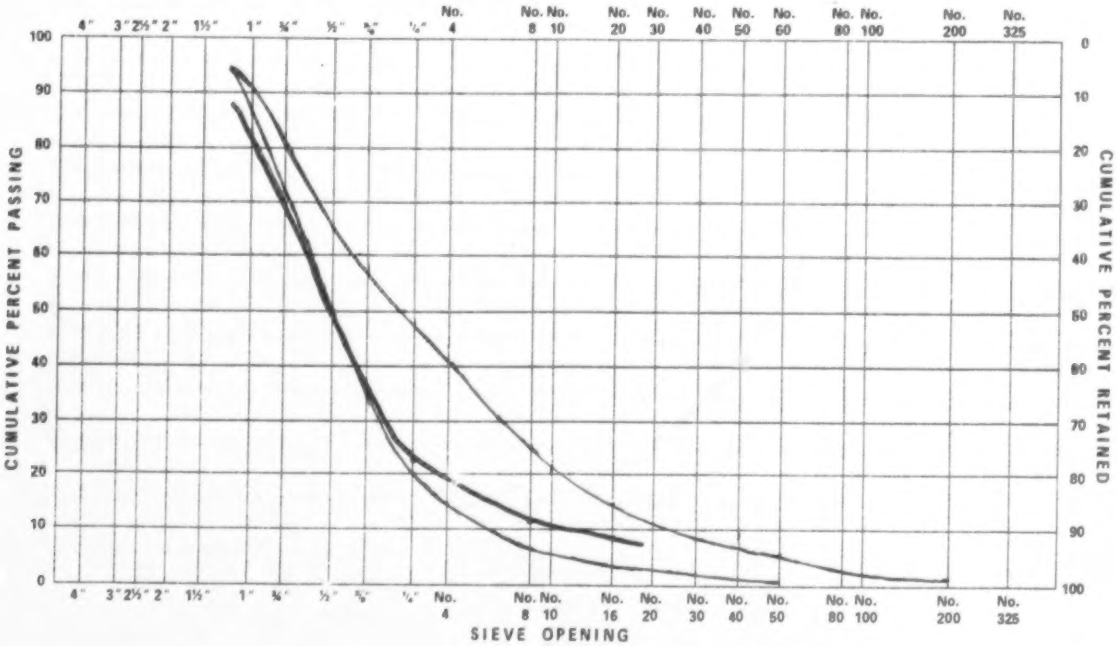
DATE SAMPLE TAKEN 5-1-79

TEST SITE I

TEST PERFORMED BY JCB

SAMPLE IDENTIFICATION Olive

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.4	1313.8	1203.4	17.8	6760.2	100.0	5
1"		1108.6 1307.5	2195.3	32.5	55568	82.2	5
1/2"		841.3 1266.3	18868	27.9	3361.5	49.7	5
1/4"		836.6	7262	10.7	14747	21.8	5
#8		303.1	192.7	2.9	7485	11.1	5
#16		666.2	555.8	8.2	5558	8.2	5



15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 4

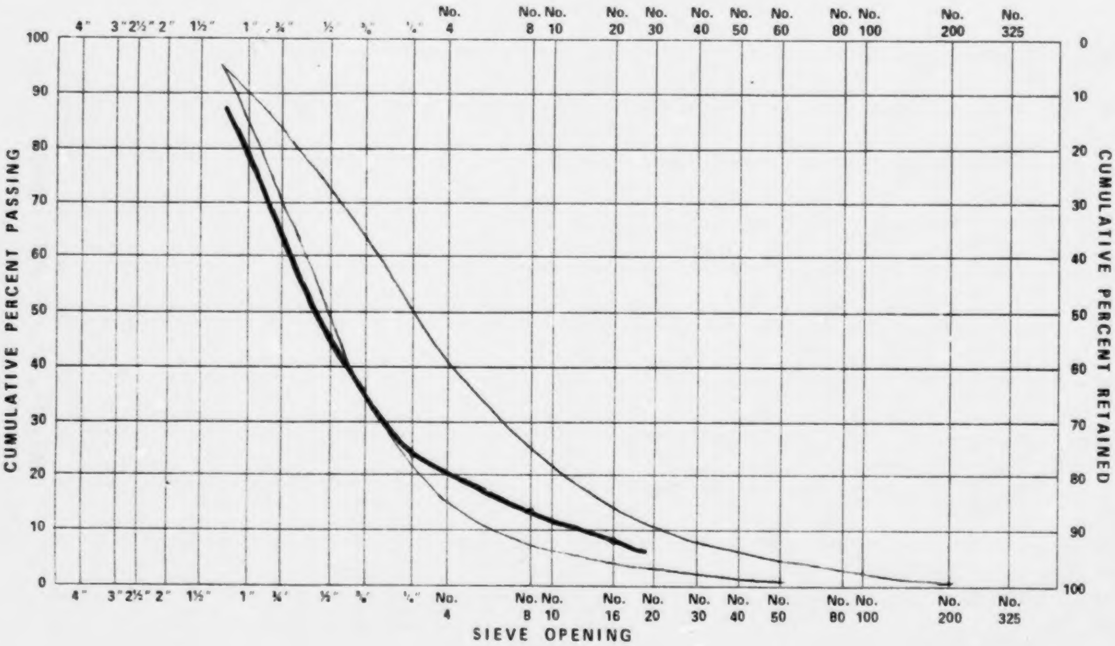
DATE SAMPLE TAKEN 5-1-79

TEST SITE I

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.4	1650.1	1539.7	21.0	7334.7	100.0	5
1"	↓	895.3 1852.7	2527.2	34.5	5795.0	79.0	5
½"		1633.4	1523.0	20.8	3267.8	44.5	5
¼"		905.7	795.3	10.8	1744.8	23.7	5
#8		457.3	346.9	4.7	949.5	12.9	5
#16		713.0	602.6	8.2	602.6	8.2	5



15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 5

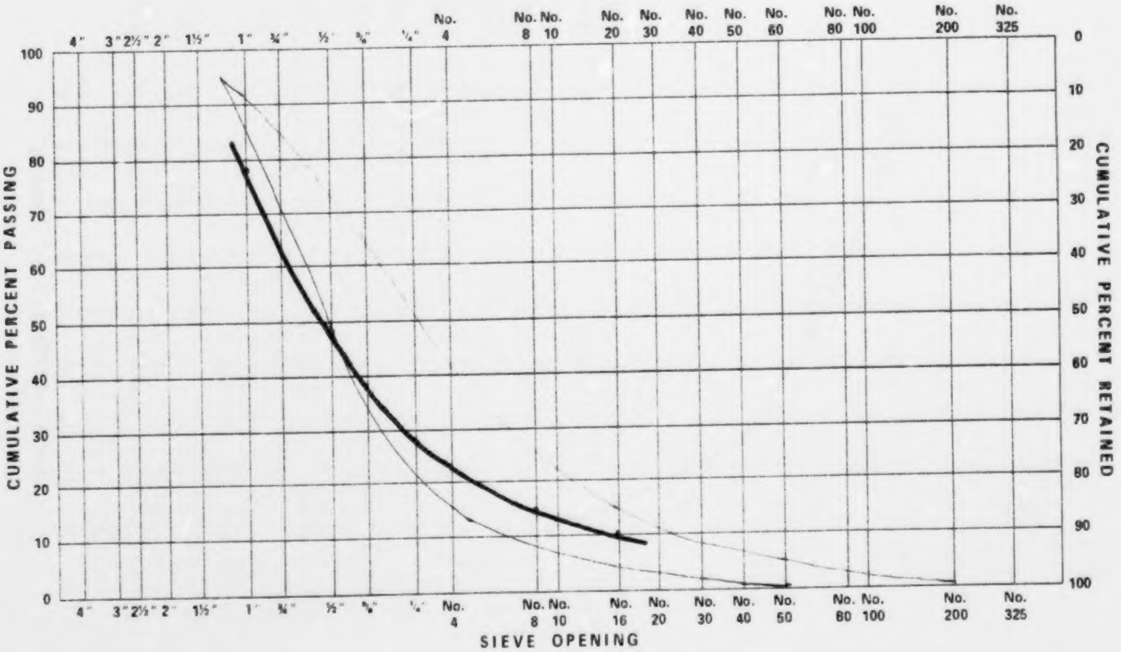
DATE SAMPLE TAKEN 5-2-79

TEST SITE I

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	110.4	1604.4	1494.0	21.9	6812.3	100.0	5
1"		687.8 1546.7	2013.7	29.6	5318.3	78.1	5
½"		432.8 1232.0	1444.0	21.2	3304.6	48.5	5
¼"		999.2	888.8	13.0	1860.6	27.3	5
#8		402.0	291.6	4.3	971.8	14.3	5
#16		790.6	680.2	10.0	680.2	10.0	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 6

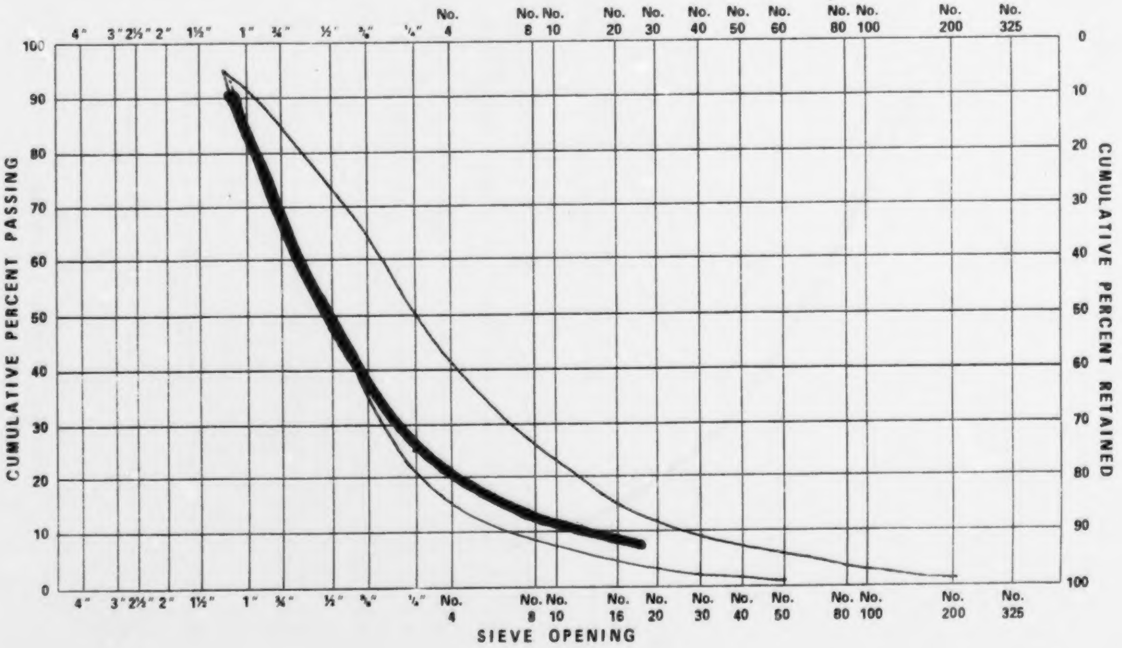
DATE SAMPLE TAKEN 5-8-79

TEST SITE I

TEST PERFORMED BY JE

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.4	1291.1	1180.7	16.8	7031.3	100.0	5
1"		1159.2 1561.2	2499.6	35.5	5850.6	83.2	5
½"		656.1 1177.5	1592.8	22.7	3351.0	47.7	5
¼"		996.1	885.7	12.6	1758.2	25.0	5
#8		373.3	262.9	3.7	8725	12.4	5
#16		720.0	609.6	8.7	609.6	8.7	5



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SIEVE ANALYSIS TEST REPORT

TEST NO. 9

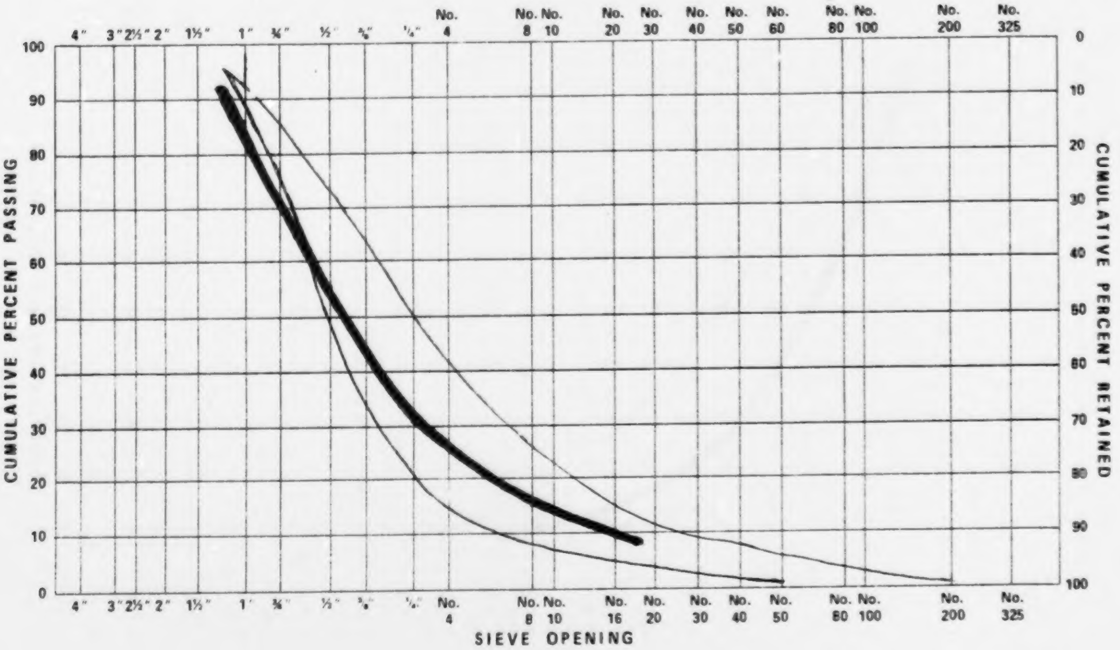
DATE SAMPLE TAKEN 5-10-79

TEST SITE I

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Ohio

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.4	1042.0	931.6	14.4	6490.1	100.0	5
1"	↓	703.5 1508.0	1990.7	30.7	5558.5	85.6	5
½"		539.0 1244.1	1562.3	24.1	3567.8	54.9	5
¼"		1143.9	1033.5	15.9	2005.5	30.8	5
#8		424.7	314.3	4.8	972.0	14.9	5
#16		768.1	657.7	10.1	657.7	10.1	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite

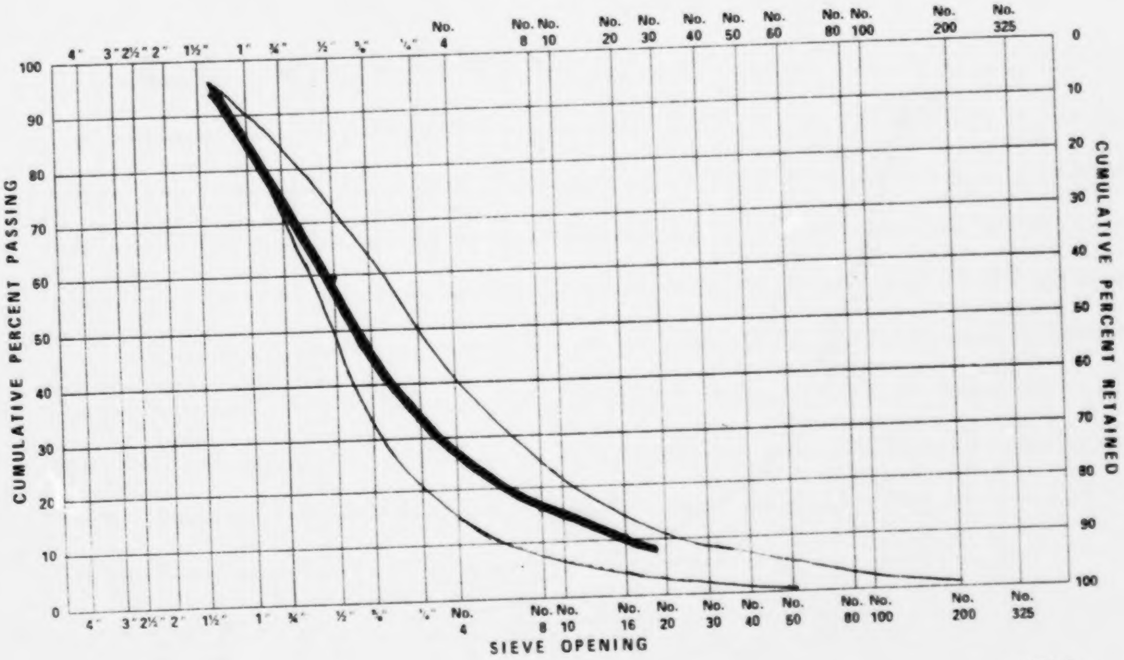
TEST SITE I

SAMPLE IDENTIFICATION Ohio Coal

DATE SAMPLE TAKEN —

TEST PERFORMED BY JCB

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	1104	1095.8	985.4	14.8	6679.9	100.0	5
1"	↓	942.7 1000.6	1722.5	25.8	56945	85.2	5
½"		826.3 1129.6	1735.1	26.0	3972.0	59.4	5
¼"		1303.2	1192.8	17.9	22369	33.4	5
#8		456.1	345.7	5.2	10441	15.5	5
#16	↓	808.8	698.4	10.4	698.4	10.3	5



15900

KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 10

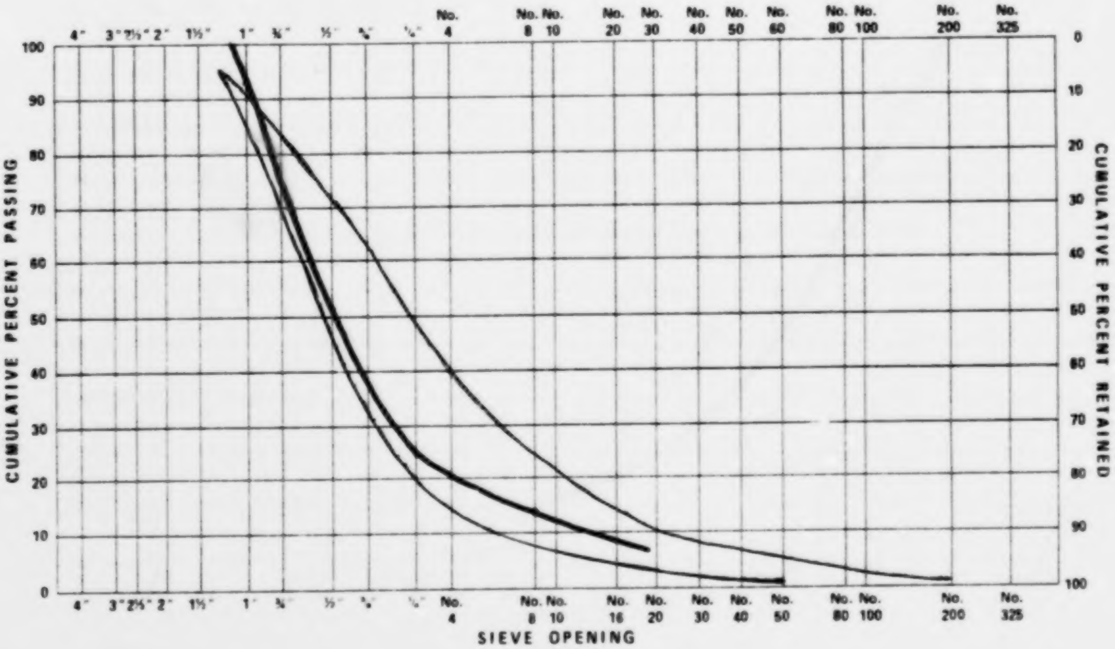
DATE SAMPLE TAKEN 5-12-79

TEST SITE I

TEST PERFORMED BY JCB

SAMPLE IDENTIFICATION Kentucky Coal

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.0	308.6 353.3	441.4	6.2	7156.2	100.0	5
1"	↓	1664.5 1600.0	3044.5	42.5	6714.3	93.8	5
3/4"	↓	1162.2 974.8	1917.0	26.8	3669.8	51.3	5
1/4"	↓	925.6	815.6	11.4	1752.8	24.5	5
#8	↓	466.8	356.8	5.0	937.2	13.1	5
#16	↓	690.4	580.4	8.1	580.4	8.1	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 14

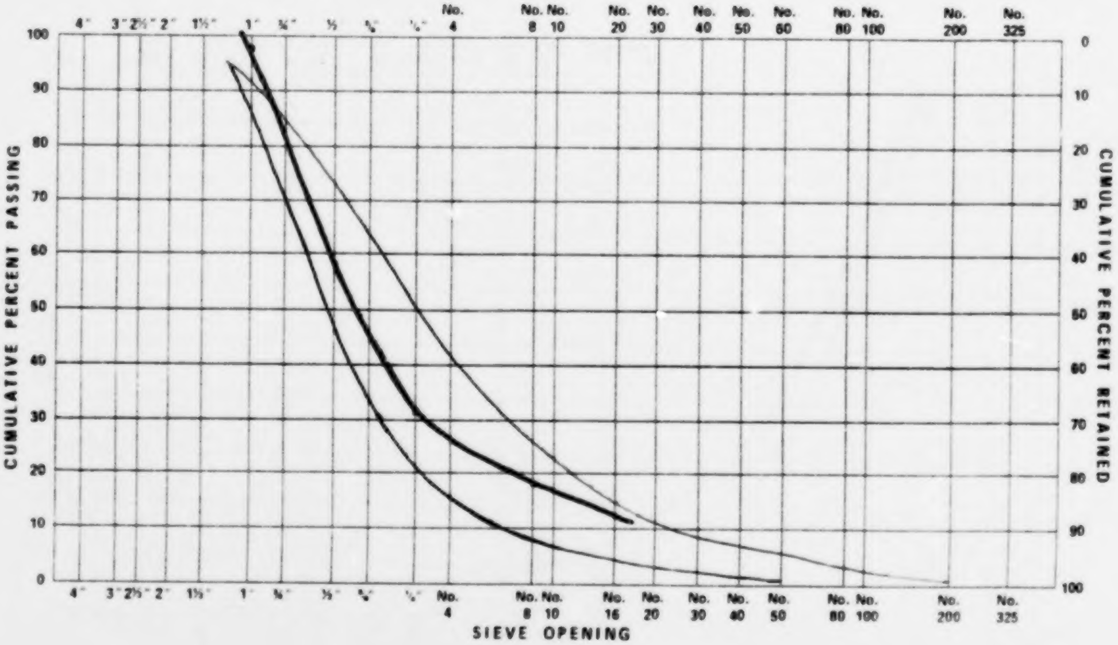
DATE SAMPLE TAKEN 5-14-79

TEST SITE I

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Kentucky Coal

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.6	286.5	176.9	3.4	5227.7	100.0	5
1"	↓	788.0 1459.9	2029.7	38.8	5050.8	96.6	5
½"		658.8 929.1	1368.7	26.2	3022.1	57.8	5
¼"		831.8	722.2	13.8	1653.4	31.6	5
#8		407.3	297.7	5.7	931.2	17.8	5
#16		743.1	633.5	12.1	633.5	12.1	5

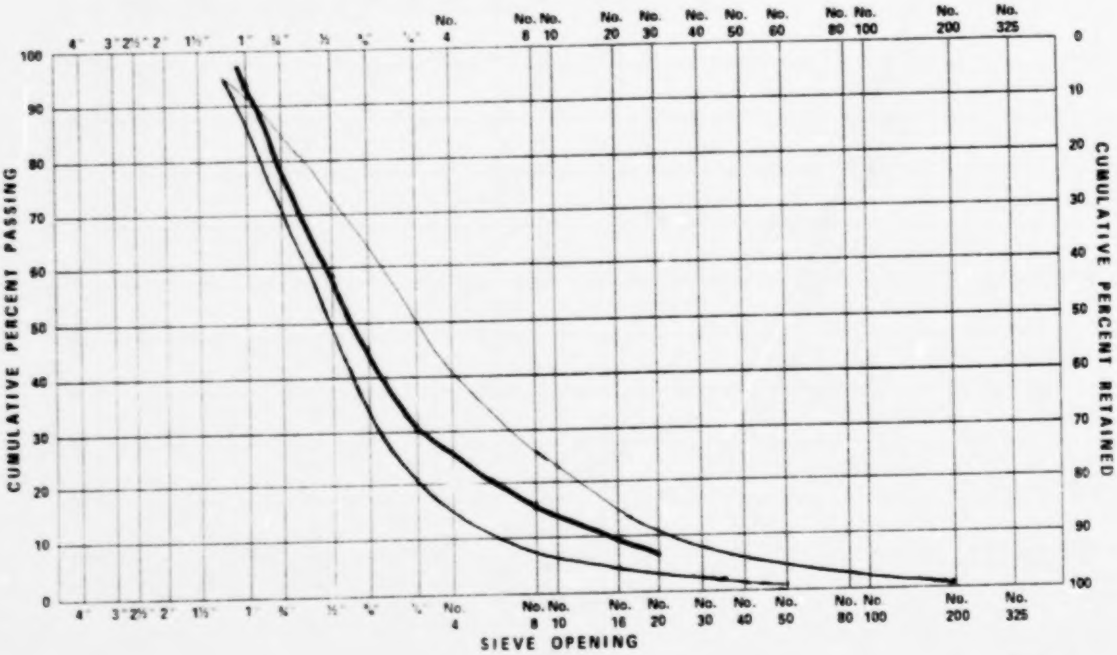


KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 15
DATE SAMPLE TAKEN 5-22-79
TEST SITE I
TEST PERFORMED BY JOB
SAMPLE IDENTIFICATION Kentucky

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
Top	110.0	80.1 518.2	408.3	6.0	6780.7	100.0	5
1"	↓	1444.9 1222.8	2447.7	36.1	6372.4	93.9	5
½"		1137.5 945.7	1863.2	27.5	3924.7	57.8	5
¼"		1082.1	972.1	14.3	2061.5	30.3	5
#8		532.0	422.0	6.2	1089.4	16.0	5
#16		777.4	667.4	9.8	667.4	9.8	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. 18

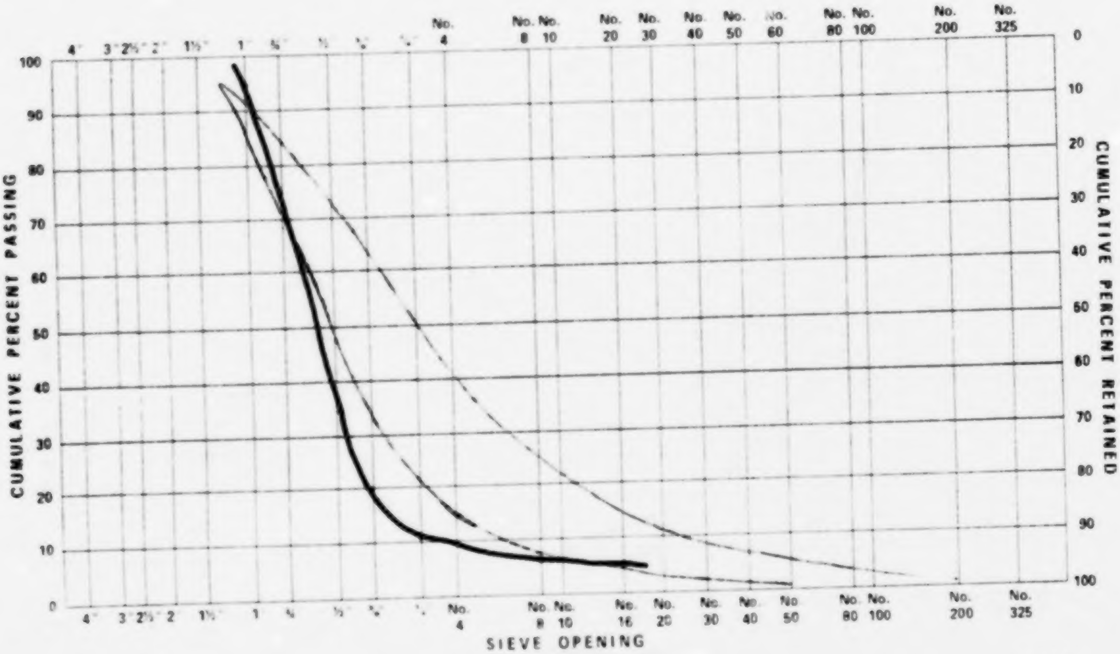
DATE SAMPLE TAKEN 5-24-79

TEST SITE I

TEST PERFORMED BY JCB

SAMPLE IDENTIFICATION Kentucky Coal

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.7	248.9 300.5	340.0	5.4	6272.8	100.0	5
1"		1246.3 2005.5 7149	3148.1	58.2	5932.8	94.6	5
½"		855.3 989.6	1605.5	25.6	2284.7	36.4	5
¼"		417.8	308.1	4.9	679.2	10.8	5
#8		188.0	78.3	1.2	371.1	5.9	5
#16		402.5	292.8	4.7	292.8	4.7	5



KVB

SIEVE ANALYSIS TEST REPORT

TEST NO. Composite

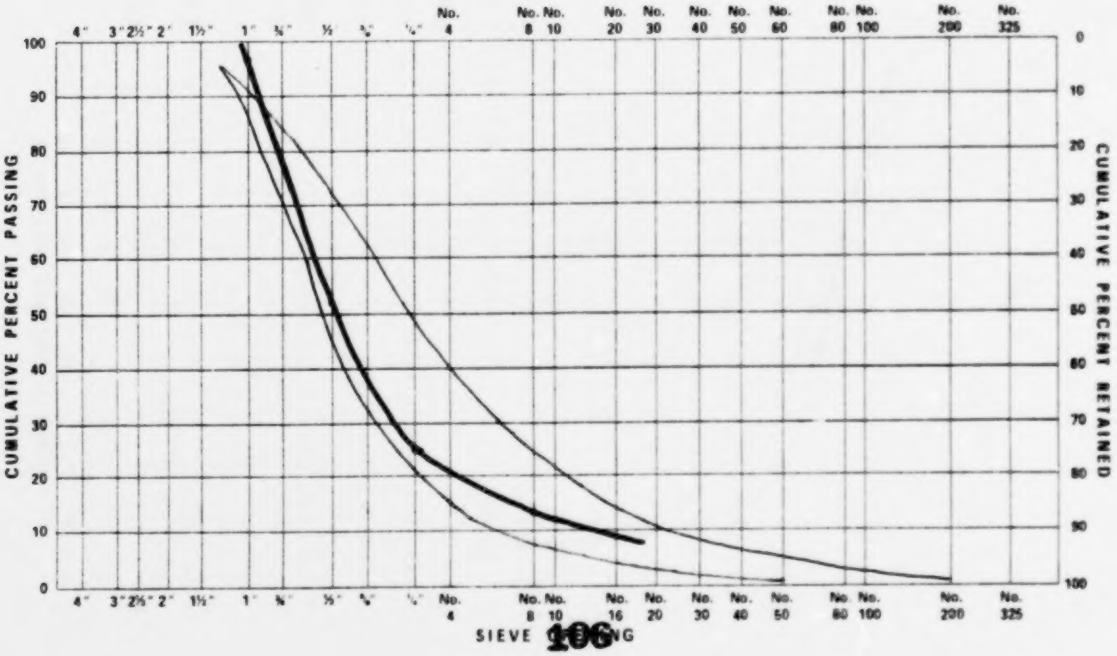
DATE SAMPLE TAKEN —

TEST SITE I

TEST PERFORMED BY JOB

SAMPLE IDENTIFICATION Kentucky Coal

Screen Size Passing	Tare Weight (gm)	Gross Weight (gm)	Net Weight (gm)	Percent (%)	Cumulative Weight Passing (gm)	Cumulative Percent Passing (%)	Sieve Shaker Duration (min)
TOP	109.7	266.5 160.0	207.1	3.5	5899.2	100.0	5
1"	↓	1530.8 1268.3	2579.7	43.7	5692.1	96.5	5
1/2"		1119.4 768.9	1668.9	28.3	3112.4	52.8	5
1/4"		755.1	645.4	10.9	1443.5	24.5	5
#8		392.7	283.0	4.8	798.1	13.6	5
#16	↓	624.8	515.1	8.7	515.1	8.8	5



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SECTION 6.0

OVERFIRE AIR TRAVERSES

PAGE

6.1 OVERFIRE AIR DATA SHEETS 108

OVERFIRE AIR TRAVERSE

SMOKESTACK FLOW PROFILE

TEST NO. 11

LOCATION NO. TEST SITE I

DATE 05-13-79

SAMPLING LOCATION FRONT OFA

INSIDE OF FAR WALL TO 19⅞"

OUTSIDE OF NIPPLE, (DISTANCE A) ______ BAROMETRIC PRESS, in.Hg 29.65

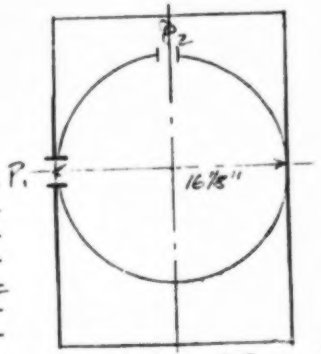
INSIDE OF NEAR WALL TO 3¾"

OUTSIDE OF NIPPLE, (DISTANCE B) ______ STACK PRESS., Ps, iwg ______

STACK I.D. (DISTANCE A - DISTANCE B) 16⅞ STK. GAS SP. GRAVITY, G_S ______

NEAREST UPSTREAM DISTURBANCE ______

NEAREST DOWNSTREAM DISTURBANCE ______



OFA control - 8.5
OFA static - 35"
RH = 60%

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_sO		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP_1	ΔP_2			
1.	3.2	0.516 + 3¾ = 4.27	0.19	0.16	101		
2.	10.5	1.693 + 3¾ = 5.44	0.22	0.18			
3.	19.4	3.128 + 3¾ = 6.88	0.22	0.18			
4.	32.3	5.208 + 3¾ = 8.96	0.21	0.17			
5.	67.7	10.917 + 3¾ = 14.67	0.17	0.15			
6.	80.6	12.997 + 3¾ = 16.75	0.15	0.15			
7.	89.5	14.432 + 3¾ = 18.18	0.14	0.14			
8.	96.5	15.609 + 3¾ = 19.36	0.12	0.12			
9.							
10. STATIC			4¼"	4"			
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

$$\text{STACK GAS SPEED, } V_s = 174\, F_s \sqrt{\overset{\text{Average}}{\Delta P (T_s + 460)}\ \left(\frac{407}{P_s}\right) \left(\frac{1.00}{G_s}\right)}$$

60-23
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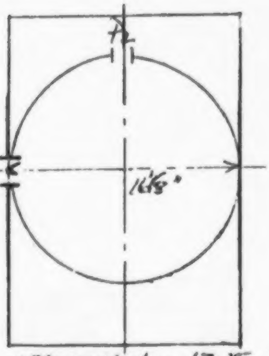
OVERFIRE AIR TRAVERSE

SMOKESTACK FLOW PROFILE



TEST NO. 12

LOCATION NO. TEST SITE I

DATE 05-13-79

SAMPLING LOCATION FRONT OFA

INSIDE OF FAR WALL TO 19 7/8"

OUTSIDE OF NIPPLE, (DISTANCE A) ______ BAROMETRIC PRESS, in.Hg 29.65

INSIDE OF NEAR WALL TO 3 3/4"

OUTSIDE OF NIPPLE, (DISTANCE B) ______ STACK PRESS., Ps, iwg ______

STACK I.D. (DISTANCE A - DISTANCE B) 16⅛ STK. GAS SP. GRAVITY, G_S ______

NEAREST UPSTREAM DISTURBANCE ______

NEAREST DOWNSTREAM DISTURBANCE ______

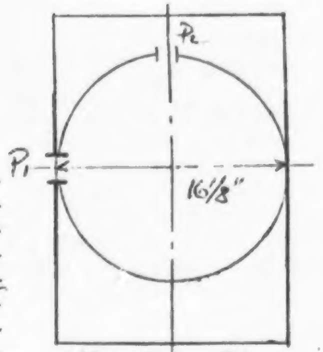
OFA control - 13.75
OFA STATIC - 7 3/4"
RH = 60%

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_sO		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP_1	ΔP_2			
1.	3.2	4.27	0.37	0.38	101		
2.	10.5	5.44	0.41	0.39			
3.	19.4	6.88	0.41	0.40			
4.	32.3	8.96	0.42	0.40			
5.	67.7	14.67	0.38	0.38			
6.	80.6	16.75	0.36	0.36			
7.	89.5	18.18	0.32	0.32			
8.	96.5	19.36	0.29	0.28			
9.							
10. STATIC			1"	1½"			
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

$$\text{STACK GAS SPEED}, V_s = 174\, F_s \sqrt{\overset{\text{Average}}{\Delta P}(T_s + 460)\left(\frac{407}{P_s}\right)\left(\frac{1.00}{G_s}\right)}$$

60-23
rev. 11/74

OVERFIRE AIR TRAVERSE
SMOKESTACK FLOW PROFILE



OFA control - 21
OFA STATIC - 10¾"
RH = 60%

TEST NO. 13
LOCATION NO. TEST SITE I
DATE 05-13-79
SAMPLING LOCATION FRONT OFA
INSIDE OF FAR WALL TO 19⅞"
OUTSIDE OF NIPPLE, (DISTANCE A) ______ BAROMETRIC PRESS, in.Hg 29.65
INSIDE OF NEAR WALL TO 3¾"
OUTSIDE OF NIPPLE, (DISTANCE B) ______ STACK PRESS., Ps, iwg ______
STACK I.D. (DISTANCE A - DISTANCE B) 16⅛ STK. GAS SP. GRAVITY, G_S ______
NEAREST UPSTREAM DISTURBANCE ______
NEAREST DOWNSTREAM DISTURBANCE ______

TRAVERSE POINT NUMBER	% OF STACK DIAMETER	DISTANCE FROM INSIDE WALL	VELOCITY HEAD (Δp_s), in. H_sO		STACK TEMPERATURE (T_s, °F	OXYGEN %	STACK GAS SPEED, Vs ft/min
			ΔP1	ΔP2			
1.	3.2	4.27"	0.54	0.60	101		
2.	10.5	5.44	0.60	0.60			
3.	19.4	6.88	0.64	0.63			
4.	32.3	8.96	0.67	0.63			
5.	67.7	14.67	0.61	0.54			
6.	80.6	16.75	0.55	0.51			
7.	89.5	18.18	0.49	0.46			
8.	96.5	19.36	0.29	0.42			
9.							
10. STATIC			11¼	10			
11.							
12.							
13.							
14.							
15.							
16.							
17.							
18.							
Average							

STACK GAS SPEED, $V_s = 174\ F_s \sqrt{\overset{\text{Average}}{\Delta P (T_s + 460)}\ (\frac{407}{P_s})\ (\frac{1.00}{G_s})}$